THE IRON AGE

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JULY 25, 1935

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Perhaps We Are Old Fashioned

ONCE in a while we receive a letter from a man who takes exception to our editorial treatment of the so-called "New Deal."

One of these arrived last week and accused us of being reactionary, out of touch with the times and old fashioned. "You criticize the Administration in your editorials," says the writer," and in the rest of the paper you tell how good business is getting." Why are you not consistent and give the New Deal credit for saving business and making it improve?"

Now that's a fair question. Certainly it would be rather ungracious for either business or a business paper to condemn a real benefactor. It is not nice to bite the hand that feeds you.

The point is that we believe that the present Administration, while it undoubtedly has fed a large number of people with taxpayers' money, has **not** fed business. On the contrary, it has given every indication of trying to starve it to death. And we believe that the business gains that we are now recording in The Iron Age are primarily due to the restoration of confidence caused by application of a Supreme Court check rein to a runaway horse that was headed, hell bent, toward the quicksands of state socialism or worse.

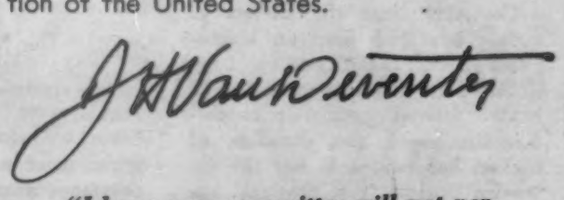
This opinion is borne out, we think, by the fact that the upturn, distinctly contra-seasonal, occurred only after the sick chicken ate up the blue eagle.

Yes, perhaps we are old fashioned. We still believe in hard work, in thrift, in cooperation between employer and employed and in fulfilling promises that have been made. We admire the old fashioned man whose word was as good as his bond.

Speaking of promises, we wonder how many of you recall the solemn promise which each new President makes to his people before he is permitted to assume office?

It is a bit old fashioned too, perhaps, since it dates back to the horse and buggy days of George Washington.

"I do solemnly swear that I will faithfully execute the office of President of the United States and will, to the best of my ability, **preserve, protect** and **defend** the Constitution of the United States."



"I hope your committee will not permit doubts as to constitutionality, however reasonable, to block the suggested legislation."

President Roosevelt to House Ways and Means Committee in connection with Cuffey bill.

Evolution of Steel-Shapes Processing

By L. M. WAITE

UTILIZATION of combined pneumatic-hydraulic power is provided for in the design of a new 14,000-ton steel extrusion press. The power is generated by what is, in effect, an air explosion. Its application has led to the scientific possibility of extruding and piercing ferrous metals directly into finished shapes from ingot or billet in plastic condition. For purposes of this article such plastic condition can be specified as at that heat-point at which the metal when deformed will remain in its deformed state if allowed to cool down from such heat-point.

The extruding of non-ferrous metals has long been an accomplished fact. Inability to avoid destructive die and tool contact with heated ferrous metals or to sufficiently lessen the duration of contact has tended to bar the extrusion process from practical application in the field of ferrous activity. However, some headway has been made, particularly in foreign countries, in the utilization of mechanical power within narrow limits. Such development has concerned, primarily, designing for tremendous pressures without particular relation to high-speed movement.

There have been difficulties surrounding the avoidance of liberal patents, granted on the mechanical powering of equipment for extrusion purposes. These equipments have included many devices engineered in a world-wide effort to gain satisfactorily finished products after the elimination of intermediate processes. Owing to common thought on pressure value rather than on the value of mechanical art, in this case purely scientific, patent difficulties have seemed almost unsurmountable.

The New Thought

This condition was recognized by Stanley W. Sparks, Norwalk, Conn., who reasoned that a new application of power principle to be developed would be that of getting ferrous metals, in pierced and extruded lengths up to 30 ft., away from and clear of tools within an allotted period of time; the time not to be of sufficient duration to permit destructive effects by metal heat. He visualized both a means and the possible economic advantages through cost reduction.

Experimentation and Results

Over a number of experimental years his presentations and demonstrations have been along lines which have bordered, more or less, on "makeshift" because of the expense involved in building new equipment. Even makeshift equipment has run into heavy expenditures. The operation of such equipment has been carried on at nationally important plants and has brought about reasonable accomplishment in the production of tubing and the smaller shapes in diameters up to 2 in. Single refined Reading wrought iron has been extruded to 1⅝ in. from 6-in. round diameter. The extruded product has shown a 12½ per cent increase in tensile strength and yield point.

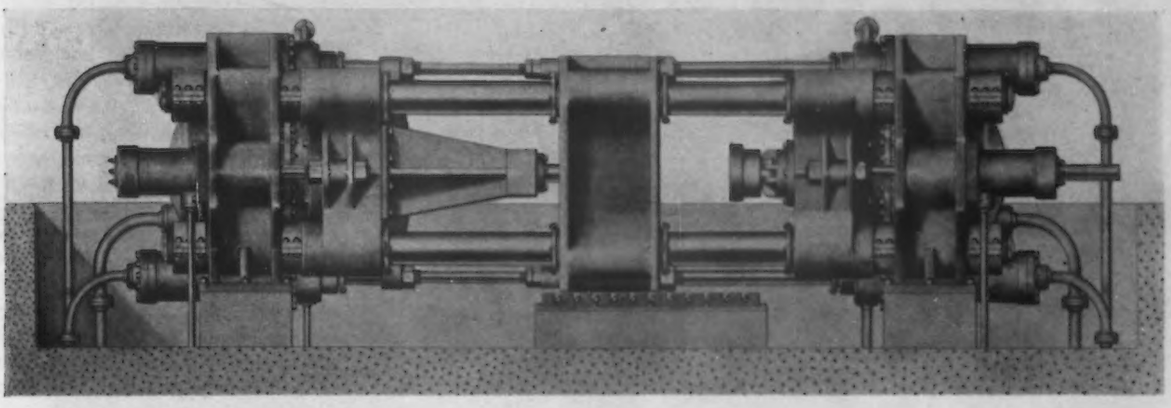
As a result of such accomplishments negotiations are now under way, in the extended patents investigation stage, for licensing production within this range to a prominent maker of steel shapes.

There are also those, prominent within the industry, who believe

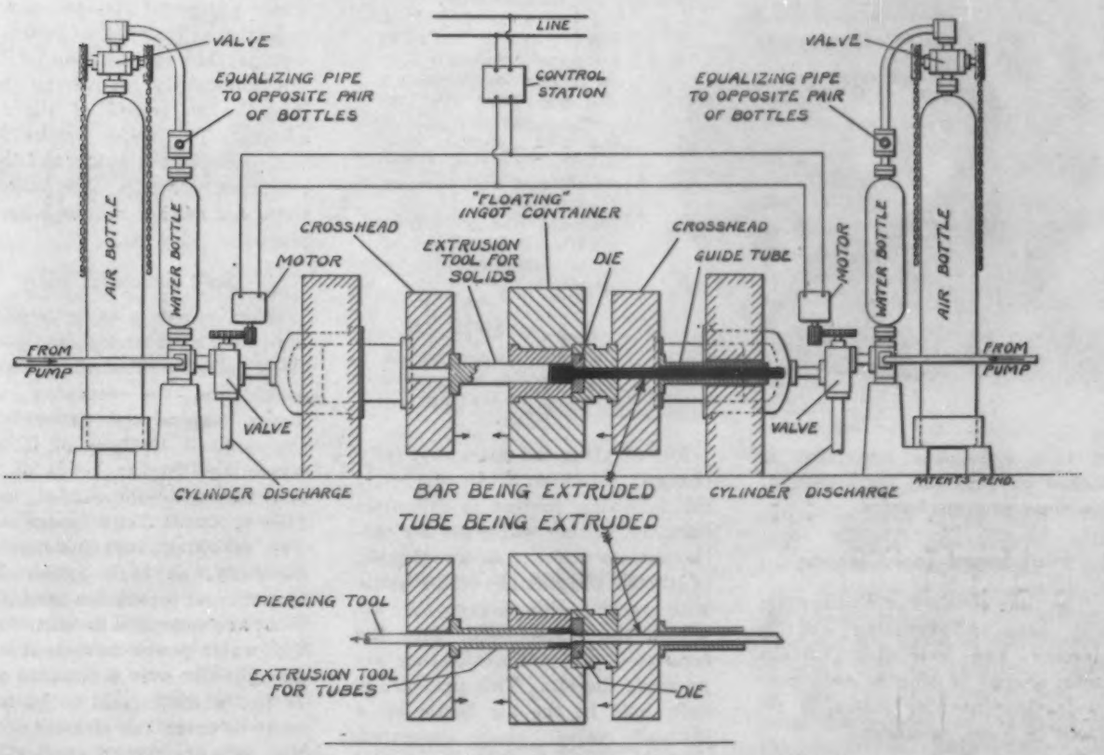
that the process has possibilities in connection with extrusion of tubing and rounds up to 12 in. in diameter and shapes of like areas. The inventor, with apparent conservatism, places little credence on necessity for imposition of diameter limits and is well fortified with samples, drawings and engineering checks on basic theories as well as by a considerable experience in actual operation of two equipments of limited capacity and not of bottle-power type described herein.

Mr. Sparks has had wide experience as a designer and builder of mechanical equipment and is conversant with details of its industrial use. As president of the Simplex Machine Tool Co., Cleveland, he designed and built gun machines which were widely adopted. He was vice-president and general manager of the Lake Erie Machinery & Supply Co., a subsidiary of the American Steel & Wire Co. He organized and became president of Cleveland Machinery Supply Co., Cleveland.

Mr. Sparks's initiation into the

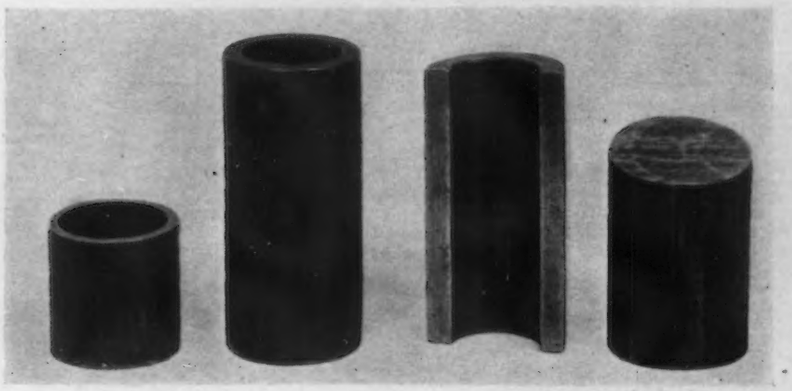


ILLUSTRATING the application of extrusion power in the original Sparks 2000-ton, single-cylinder, high-speed, double-acting, hydraulic tube extrusion press. In this machine pumps or accumulators were used for power generation. The diagram below illustrates the method of substituting the explosive-like power herein described.



DIAGRAMMATIC longitudinal cross-section (principal parts only) of the proposed Sparks 14,000-ton steel extrusion press. The lower diagram illustrates the type of extrusion tool employed for tubes and shows the piercing tool and its position for tube operations. Note that the end of the piercing tool is supported in the die and that the wall of the tube is formed by the metal which passes between the die and the piercing tool. For bar or solid extrusion the type of extrusion tool employed is illustrated in the full diagram. Auxiliary bottles and cylinders, as described but not shown, are employed for returning the cross-heads and rams to "shot" position. The chains at the air bottle valves are for ease in valve opening and closing during air charging operations. The cylinder valve is operated, through pinion, gears and clutch, by a 10-hp. motor.

field of extrusion processing was in 1914. His developments in extruded shells were recognized and widely used during the World War. Since 1921 his work has pertained to the art of extruding elongated shapes and, during more recent years, he has turned to the high-speed movements which feature his new equipment layouts. His study of this high-speed movement is backed by practical knowledge of machines and mechanics.



ABOVE

THE thin wall illustration, at the left, is of a 25 to 1 reduction, high-speed steel tube extrusion.

The second illustration is of Reading wrought iron tube. The material showed a 12½ per cent increase in strength and yield-point after extrusion.

The third illustration is a sectional view of a 14 to 1 reduction in steel tube extrusion.

The illustration on the right is a 7 to 1 reduction in solid extrusion.

o o o

AT LEFT

THIS die was used for 108 consecutive, high-speed extrusion operations or "shots."

High-Speed Tool Clearing

The time element of tool contact with heat in extruding and in piercing and extruding ferrous metal shapes of lengths even over 30 ft., the inventor states, is reduced to 5 sec. or under.

The method of accomplishment involves, as diagrammatically illustrated, a valve-opening withdrawal of water, which withdrawal provides space for the creation of air-expansion power. This power energizes ram-speed movement with 6500 lb. water pressure, back of four 56-in. diameter rams. The pressure is developed by an explosive-like expansion of air, which has been compressed in a bottle or system of bottles, by water force, and held therein by valves. The valves are, in production operations, electrically operated and controlled.

For effecting the operating, fully charged, condition of an air bottle the following routine is followed: Initially, neither water nor air bottle contains water. The water pump is started and fills the water bottle with water; this forces the air within the water bottle into the connected air bottle, effecting air pressure therein. This pressure is then held in the air bottle by a shut-off valve, chain operated, while the water bottle is drained of water, admitting, of course, air. This newly admitted air is then also forced into the air bottle by water-pump pressure as before and held there, increasing the pressure. This air compressing, by water against air, is repeated until the air bottle becomes fully charged with compressed air. After being thus compressed and confined, the air is used over and over, there being no avenue for its escape other than via confined water, valve controlled, in the water bottle and under pump pressure, through which the air will not pass. In case air bottles should be used in tandem, connections are made with the originally charged bottle. Otherwise the air bottle is fully closed at one end and has valve opening at the other. The ultimate per-bottle air pressure against water contained in water bottles is, in cubical contents, seven times the cubical amount of water. In other words it might take, theoretically, seven drainings of the water bottle to originally charge the air bottle. In practical charging operation there will be only that number of drainings up to and including which the water pumps are sufficiently powered to attain increased air pressure in the air bottle.

In operation, water charge is maintained by four motor-driven water pumps of 700 gal. per min. capacity. (There is, of course, leeway in this specification.) These are constantly delivering water into the water-end of the bottle system. The water bottles intervene between the pump and the air compression bottle. Air pumps, as such, are neither required nor employed.

Split Second Timing

When power is to be applied to the rams, a water-end bottle-valve, electrically operated and controlled, opens and the escaping water power, explosively generated by the confined air back of it, is directed against the heads of rams and through compounded mechanism produces the extrusion stroke. The resulting ram movement is, obviously, at high speed. These elements of operation and movement are measured in split seconds. The water power-movement is in a straight line over a distance of but 22 in., which is said to be insufficient to enter the element of friction into its power application.

Additional and smaller bottles and cylinders are used to generate the power for returning the rams to "shot" position. Water and air bottles are seamless and are tested

(CONTINUED ON PAGE 78)

The Chronolog is connected with the gage used in making the last inspection and thus shows visually at all times the number of pieces that have been produced and inspected.

New Methods of Inspection Speed Up Output of Small Automobile Parts

INGENUITY in reducing production cost probably is not displayed to any greater extent in any branch of the metal-working industry than by manufacturers of small automobile parts. With large production and, at best, narrow margins of profits per piece, manufacturers of these parts constantly are spurred to cut cost corners wherever possible.

An increase in output, much more rapid inspection and almost complete elimination of rejects, have been brought about by the adoption by the National Acme Co., Cleveland, of new methods of inspecting small parts machined on a large production basis.

o o o

By F. L. PRENTISS
Resident Cleveland Editor, The Iron Age

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This inspection procedure is applied to the inspection of front and rear housings or end plates for starting motors, which are machined under a group bonus plan with a special line of equipment for progressive operations. The total earnings of the employees in the group, including four girl inspectors, are based on the number of parts that are shipped. Under the new inspection set-up the finished parts are not inspected in the inspection department. Instead, the housing department does its own inspecting and is entirely independent of the inspection department. The responsibility for output rests entirely with the

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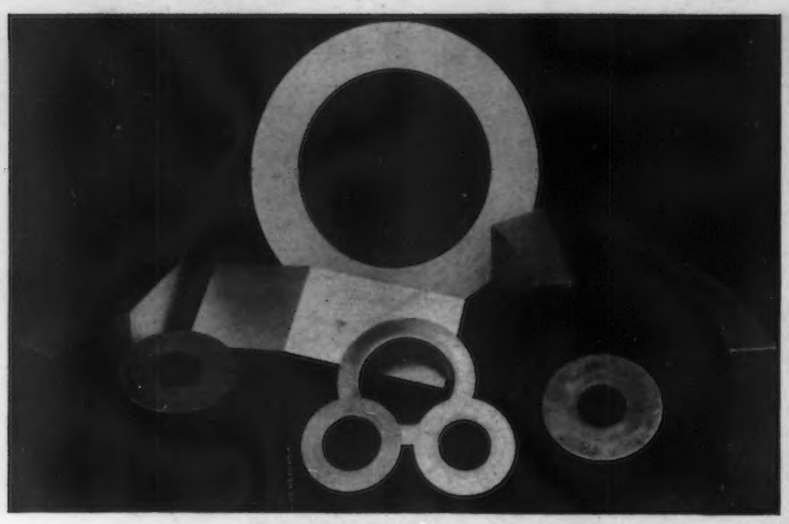

Ampco Metal forming dies.

BRONZ

Its

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Stainless steel parts formed on bronze dies.

IN late years, and especially with the advent of stainless steel for wide usage, the problem of suitable alloys for use in die work has been receiving increasing consideration. The factors which have influenced this search for better materials are, in part, the desire for longer life from dies, greater continuity of operation, less maintenance, better work appearance, and reduction of buffing and finishing costs.

Various die steels and cast irons are in service throughout the die shops of the country. And variations of these steels and irons are introduced from time to time. In a few instances cemented carbides are used for dies on small work and very extensive runs. One of the most unusual metals adaptable for general die service is an alloy produced by Ampco Metal, Inc., Milwaukee, Wis. A bronze of the copper, aluminum, iron type, it is produced with as-cast hardnesses ranging up to 340 points Brinell hardness, measured under a 3000-kg. load. Softer bronzes are, of course, not suitable. And bronzes heat treated to obtain the required hardness lack the strength and intergranular bond necessary to withstand the extreme stresses encountered.

In addition, Ampco Metal, as this alloy is called, contains an intermetallic iron-aluminum compound which imparts superior wear resistance to the alloy, as evidenced by the greatly increased life shown by the softer grades in gear, bearing, bushing, and welding jaw service. This intermetallic compound consists of very finely divided particles, which are intensely hard, and which, with the delta phase, carry the wear-resistant burden of service.

Since the beginning of the machine age, bronze has been recognized as an anti-friction metal, well suited for sliding contact with mating steel surfaces. Logical, then, is the inference that a bronze hard enough and strong enough for the service would make an excellent die material; and yet even hardness is not the key, for while most Ampco Metal dies in use have a Brinell hardness of slightly over 300 points, yet they outwear hardened or nitrided steel dies of 600 Brinell hardness or over. The ostensible reason for such performance is the smoother, easier action of unlike metals in contact.

In the first paragraph of this article were mentioned factors which influenced the quest for more suitable die metals. Analysis of Ampco Metal's relation to these factors may be of interest. First mentioned was the desire for longer life from dies. Users of these bronze dies have advised that they almost invariably outwear steel dies due to the fact that steel dies will gall and "load," and the frequent redressings necessary wear the steel dies out of size much sooner than the Ampco. There are exceptions, of course, but on the average 70 per cent of the bronze dies render considerably longer life than steel or cast iron.

The second and third factors mentioned were the desire for greater continuity of operation and fewer maintenance requirements. In assembly or general industrial plants where smooth operation of several departments is interdependent, continuity of operation of forming, stamping, or drawing in one or more of the departments is an important factor. Further, but in this same respect, reduction of maintenance time and expense is likewise important. The use of non-galling dies is of distinct advantage here. The bronze requires only from one-fifth to one-twentieth

Its Use as a Forming and Drawing Die Material

o o o

By J. D. ZAISER and G. K. DREHER

Ampco Metal, Inc., Milwaukee, Wis.

o o o

as much redressing as steel, again because of the fact that unlike metals running together do not load or pick up and the surface of the die remains smooth and clean. A manufacturer, for instance, who is cold-reducing 2¼-in. pipe with a 3/32-in. wall to 1¾ in. in two operations, has advised that the steel dies previously used afforded 200 to 300 pieces before requiring redressing; the Ampco dies in service at present afford from 1500 to 3000 pieces before the die must be cleaned up. Similarly, a manufacturer drawing stainless steel bowls obtains 125 pieces from the copper-base die as against 25 pieces from the steel die between redressings.

Stainless steel tray and pan formed on bronze dies.

The fourth and fifth factors mentioned as being desired in die materials were better work appearance and reduction of buffing and finishing costs. These factors are confined to certain types of production, of course, inasmuch as finish is of little or no importance in many of the parts now being fabricated.

Stainless steel fabrication in most cases involves good finished appearance, however, and in the production of stainless articles the die problem is most acute. Here elimination of buffing costs is more important than life of the dies, from the cost standpoint. Stainless, being a tough metal, is difficult to form or draw at best. And any die material that will not only render longer life, but that will also resist loading or galling, is ideal. Because of this latter characteristic, Ampco Metal is being used not only in connection with stainless steel, but also with sterling silver, nickel silver, and aluminum.

Due to the absence of die marks on pieces so formed, buffing costs can be reduced from 50 per cent to 75 per cent. Thus, not only are production and finishing costs lowered, but better work is produced, production "kinks" are to a great extent ironed out, and die costs themselves are reduced.

Work done on copper-base dies includes the forming of automobile frames, oil line pipe, refrigerator tops, bumper guards, stainless steel trim, pre-lacquered trays, automobile fenders, zinc battery shells, hacksaw frames, wire shapes and plastics. Ampco dies are also being used for drawing of washing machine tubs, sterling silver trays, German silver cups, tantalum wire, stainless steel beer barrels, gasoline pump domes, automobile headlamps, and for the swaging of torque tubes.

Dies are cast from either wood or plaster of paris patterns. By casting close to size, a great deal of machine work is eliminated. No heat treatment is required, so that there is no danger of warpage or deformation from high temperature contact. The hard grades of Ampco

(CONTINUED ON PAGE 78)

Ampco Metal dies as cast. They require very little tooling before being placed in service.

Heat-Treating 1000

MAKING more than one hundred different classes of machines, the International Business Machines Corpn. has the problem of heat-treating fully one thousand separate wearing parts. For the sake of simplification most of the structural and working parts of machines are confined to five analyses

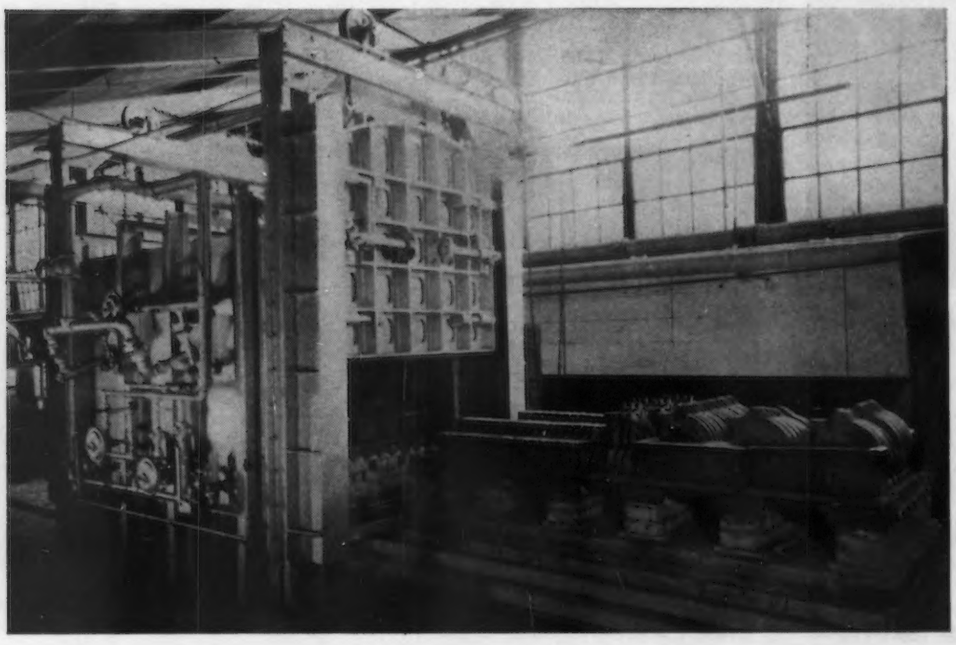
WHEN a plant is called upon to heat-treat a thousand or more different metal parts it is a vital necessity to classify and simplify the many heat-treating processes involved, commensurate with the physical characteristics required. This includes standardizing on a minimum variety of steels and alloys as well as standardizing on a minimum number of heat treatments. With this accomplished, it is then possible to erect a heat-treating division with the least number and variety of furnaces and equipment and to greatly decrease the size of the personnel.

Company Makes 115 Different Types of Machines

With this in view the International Business Machines Corpn., the world's largest maker of business and office machines, recently rebuilt and reequipped its heat treating division at its plant in Endicott, N. Y. This concern makes 115 different classes of machines and its plant includes 25 buildings with a combined floor space of 575,000 sq. ft. and employs 3500 workmen. Its machines are characterized by intricacy, large number of parts, precision of operation, long life and indispensability in modern office work. Some of these machines combine 25 or more separate accounting functions. The Alphabet Subtraction Accounting Machine has 50,000 separate pieces consisting of 2400 different parts and contains 75 miles of wire connections.

In the construction of these machines, strength of materials is paramount, and for wearing parts the required physicals can be obtained only by heat treatment. This phase is handled in a modern and completely equipped heat-treating division recently redesigned and rebuilt. As stated, a thousand different parts pass through here, and simplification of heat treatments has been accomplished in part by selecting steels of only five analyses for most of the structural and working parts of the machines. These five analyses are SAE 1010, 1020, 1112, 3115 and 3140. Depending upon the grade and requirements, these analyses are purchased in the form of hot-rolled and cold-drawn bar stock, forgings and cold-rolled strip. In addition to these Norway iron, nickel alloy magnetic iron and silicon iron are used extensively for magnet cores and armatures. The desired electrical properties are obtained by a final annealing treatment after the parts have been completely machined.

Beryllium copper, the new alloy of copper which under proper heat treatment develops a hardness comparable with tempered spring steel,



o o o

AT LEFT

GAS-FIRED car-bottom furnace, showing loaded car and system of firing.

AT RIGHT

ROW of gas-fired carburizing furnaces.

o o o

Different Parts

By J. B. NEALEY
American Gas Association

of steel. Beryllium copper is also being used for various electrical contact parts. Standardization of materials has been accompanied by standardization of heat-treating operations, which was made possible by reconstruction and reequipment of the company's heat-treating division.

and electrical conductivity equal to or better than that of brass and bronze, is also being used in appreciable amounts for various electrical contact parts.

The heat treatment for each part is specified on the blueprint and is listed on the operation record which accompanies each manufacturing lot in process. The manufacturing lots as received at the heat-treating department are delivered to one of three sections: carburizing and annealing, case hardening, or the tool and die section. Gas fuel has recently replaced fuel oil, and there are 22 gas-fired furnaces and seven electric furnaces in the department.

Carburizing and Annealing Section

Three box-type furnaces are employed in the carburizing and annealing section. These are gas-fired and are equipped with automatic temperature controls of the potentiometer type, operating on and off motor valves in the air lines. The air is supplied to all the furnaces from one big blower at one pound pressure. The gas is dropped from line to atmospheric pressure and is inspirated at the burner by the air, the ratio of the two being exactly controlled by an automatic proportioning device. The temperature control valve is cut into the air line only. Five recording and controlling pyrometers are mounted in metal dust-proof cases on the wall.

The furnaces are all of insulated fire brick construction, incased in steel plates and provided with counterweight doors. The first furnace has a hearth size 3 x 4 ft. and is overfired with four velocity-type nozzle-mixing gas burners. The second furnace has a hearth 2 x 4 ft. and is underfired by two gas burners, one on each end. The third furnace of approximately the same hearth size has six gas burners, three on each side, underfiring the hearth with the hot products of combustion rising up around both sides into the heating chamber. Steel plate aprons are used on these furnaces as an aid in loading and unloading, and likewise long-handled steel forks mounted on small wheels are employed in handling large parts, carburizing boxes, etc. Small quench tanks are conveniently placed for hardening.

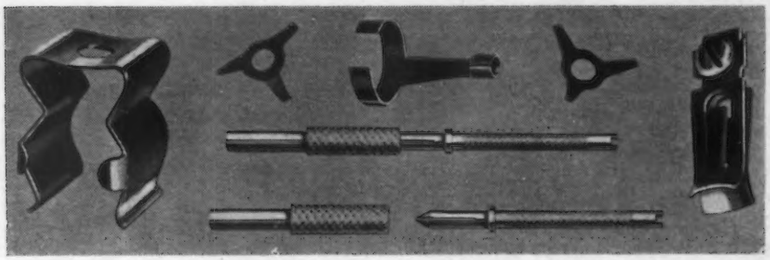
Carburizing in these furnaces is accomplished by packing the steel parts with solid carburizer in alloy heat-resisting boxes and holding the charge at carburizing heat of 1550-1600 deg. F. for 2½ to 5 hr., depending upon whether a case depth of 0.010 in., 0.015 in., 0.020 in. or over is required. Hardening practice varies in accordance with requirements, quenching direct from the box or cooling in the box and later reheating and quenching at 1450 deg. F.

A small electric vertical retort-type furnace for carburizing with city gas is also used for small parts which cannot be packed conveniently in boxes with solid carburizers. This furnace is equipped with a fan to provide forced circulation of the carburizing gases. This furnace is also used for annealing parts and alloy nickel magnetic iron parts.

Either copper plating or an anti-carburizing paint is employed for parts which require selective carburizing and hardening, as for instance gears and cams which require a soft hub to permit taper pinning in assembly, or rivets which require soft tenon ends to permit easy riveting in assembly.

This section of the heat-treating department is equipped also with a car botton furnace. This has doors front and rear and a track running through for the cars to operate on. The car hearths are 4 x 8 ft., and

there are two cars so that one can be loaded while the other is in the furnace. Heat is supplied through 16 gas burners, eight to a side, and these eight are divided into three large ones over-firing and five small ones under-firing the work. The car hearths are of heat-resisting cast alloy iron sections resting on refractory piers on the car top and the lower burners fire between these piers. This furnace is used chiefly for the annealing of cast iron to relieve casting strains and to improve machinability, and for the annealing of Norway iron to obtain proper electrical properties. In order to prevent surface oxidation, the Norway iron parts are packed with cast iron chips in heat-resisting alloy iron boxes of suitable size.



ABOVE

SMALL parts formed from beryllium copper. Parts made of this material combine fatigue resistance, corrosion resistance and conductivity.

Case Hardening Section

The case hardening section contains seven standard pot furnaces 3 ft. in diameter, 4 ft. high and hooded with induced draft for fume removal. Cyanide or other commercial salts having similar case hardening effects are used in these pot furnaces. The pots are 12 x 18 in., and each furnace is heated with two or three gas burners of the type already described, firing tangentially to the pots and located close to the top of the furnaces. The waste products of combustion are vented near the bottom. Each furnace is built of 4½ in. of firebrick and 4½ in. of insulation and is incased in a steel shell. It is provided with an automatic temperature control like that used on the other furnaces. Pot life in these gas-fired furnaces is considerably more than that previously obtained in other types of furnaces. A pot life of 7500 heat hours is not unusual.

In front of the pot furnaces are three rectangular steel quench tanks for oil and two circular ones for water. These are served with chain hoists and steel baskets operating back and forth on an overhead rail. Above these tanks is a system of pipe coils, 3-in. pipes with 1½-in. pipes inside. The oil is pumped through the larger pipes and is cooled by cold water circulated through the smaller ones. A control board contains seven indicating and controlling pyrometers. Gears, cams, screws and small parts of SAE 1010 and 3115 steel are case hardened here by quenching at 1500-1550 deg. F. When heated for 15 min. a case depth of 0.003-0.005 in. is acquired; 30 min., 0.006-0.008 in.; and 45 min., 0.010-0.012 in. Some of these parts are drawn at a temperature of 450 deg. F. These cases are too thin to give an accurate Rockwell G scale reading, but the hardness is equivalent to file hardness.

For the hardening of high-speed steel, two oven-type electric furnaces equipped with gas curtains at the door openings are used. The gas curtain provides the necessary atmospheric control within the furnace and prevents the oxidation and scaling of parts. The high-speed steel preheat furnace is of the resistance wire type for temperatures up to 1850 deg. F. The final or high heat furnace is of the Globar type for temperatures up to 2500 deg. F.

A box-type furnace underfired with four gas burners and the above mentioned electric preheat furnace are used also for hardening stainless steel, carbon tool steel, blanking and shaving dies of high-carbon high-chromium steel.

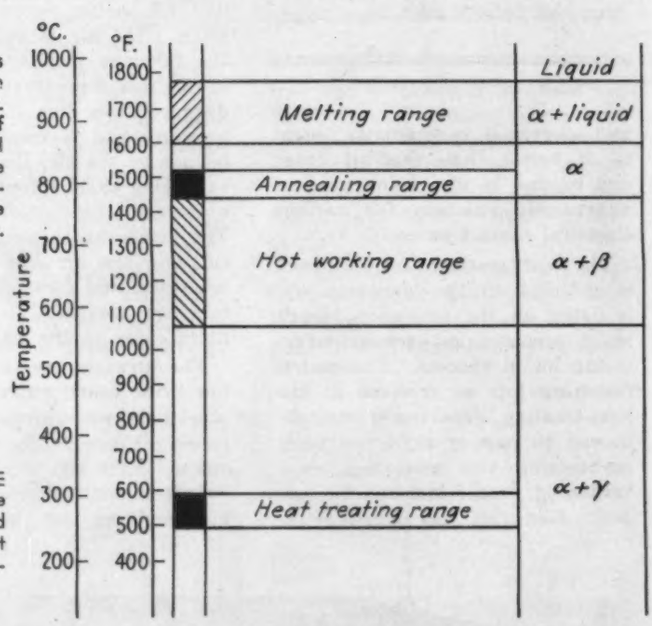
There are three pot furnaces in one of which a neutral salt is used for hardening high-carbon steel parts. These are heated with two gas burners each. Three nitrate baths, each fired with a single gas burner, are available for tempering and blueing.

Beryllium copper, the new copper base alloy, which, under proper treatment, develops great hardness and electrical conductivity equal to or better than that of brass and bronze, is finding widespread application for various electrical contact parts. Parts made from beryllium copper, analyzing beryllium, 2.00-2.25 per cent; nickel, 0.25-0.50 per cent; iron, 0.10 per cent maximum, and the balance, copper, are heated at 530 deg. F. for periods of approximately 1 hr. to 5½ hr., depending upon the ultimate hardness and physical properties desired, and also the amount of cold working the parts

(CONTINUED ON PAGE 82)

AT RIGHT

TEMPERATURE ranges in the fabrication and heat treatment of beryllium copper.



Free Cutting Aluminum Alloys for Screw Machine Work Now Available

ALUMINUM, because of the development of certain alloys, has now been added to the list of metals termed "free cutting." At least two alloys, one with magnesium and one without, in two tempers, are now available. The data in this article were supplied by the Aluminum Co. of America.

AN important characteristic of a good machining metal is its ability to discard scrap quickly. A clean-cutting material not only does not impede the cutting tool, but assures a more accurate cut. In addition, tools retain their sharpness longer because larger entrant angles may be used without diminishing the quality of the surface finish.

Long shavings are not only annoying, but they also retard operation. This is particularly true of metal machined in automatic screw machines, the speed of which makes "free cutting" absolutely essential. This is a term coined to denote the rapid breaking up of cut scrap so that it falls away from the machined piece, leaving the metal surface clean and not cluttered for the on-coming tool.

Aluminum, because of the development of certain alloys, has now been added to the list of metals which the trade terms "free cutting." To understand the difficulties which preceded this development, it may be well to sum up the conditions which brought about serviceable free-cutting metals.

The first of the free-cutting metals to be developed was leaded brass screw machine rod, containing about 60 per cent copper, 3 per cent lead, and the remainder zinc, a material which has met the requirements of free cutting so well that it has been to no little degree responsible for the present state of the modern screw machine.

High-sulphur, low-carbon, cold-drawn steel, although much more free cutting than ordinary low-carbon steel, is not nearly as satisfactory from the standpoint of machineability as free-cutting brass. Many materials, not particularly adaptable for high-speed screw machine production, are eminently satisfactory for general machining operations. Every new type of metallic material is almost immediately appraised as to its adaptability for screw machine production.

Culmination of Long Research

Commercially pure aluminum is not adaptable for general use in automatic screw machines, but high-strength, heat-treated aluminum alloys have, to a considerable degree, the properties desirable for the production of screw machine parts.

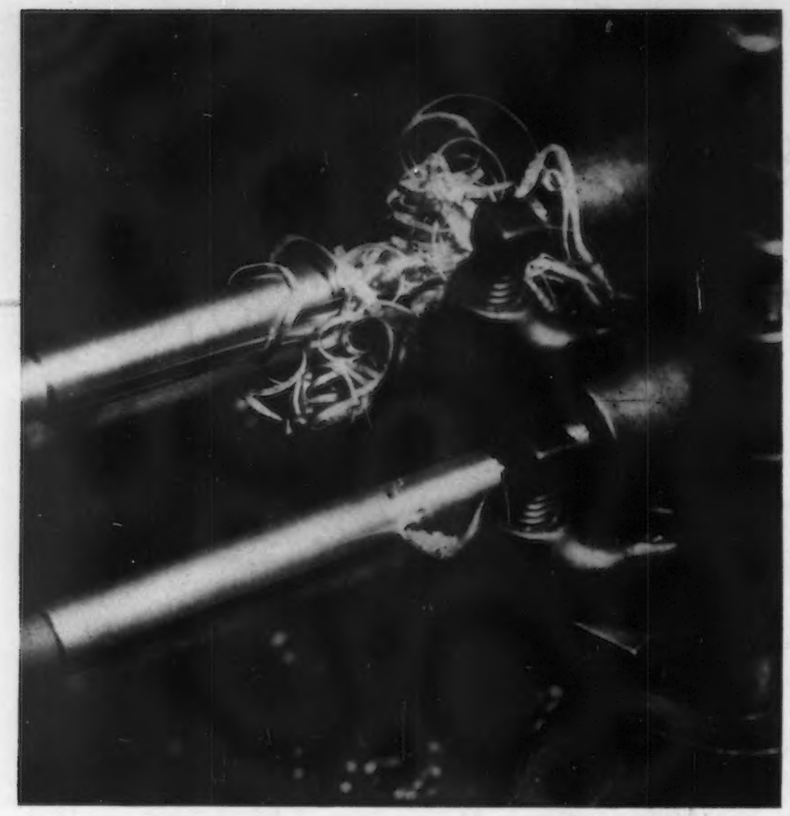
An even more free-cutting aluminum alloy has long been needed, however, and development of such a material has been studied for a number of years. The success of leaded brass screw machine rod interested aluminum research scientists, but whenever lead was added to aluminum-copper alloys in the experiments the result was failure.

During some of the experiments it was demonstrated that alloys sufficiently high in copper (8 per cent and above) machined fairly well, but these alloys could not be commercially hot rolled to rod because of hot shortness associated with the high-alloy content.

The addition of tin in certain concentrations would impart free-cutting properties to some of the heat-treatable wrought alloys, but it would so impair their hot-working characteristics that the economic production of screw machine rod from them was impractical.

Scientific thought returned time and again to a consideration of the possibilities of alloying lead and aluminum. In the course of another investigation an occasion arose when molten aluminum was fluxed with various lead salts. Subsequent analysis indicated the presence of lead in such concentration that complete quantitative reduction of the salt and solution of the lead in the liquid metal had taken place.

A preliminary test to determine the free-cutting qualities of the alloys was made by measuring tool wear and the power to remove a unit volume of metal. To examine the chip size and the finish a lathe tool was used which would give long, continuous chips and a relatively poor finish with most wrought aluminum alloys but at the same time would give small, well broken-up chips and a good finish with free-cutting brass. Such an arbitrary method of evaluation could not indicate quantitatively the performance of a material in all the variety of operations on a screw machine, and so



THE chip produced in turning one of the new free cutting aluminum alloys is shown in the lower view; that of a material with poor free cutting qualities is shown above it.

the new alloy was subjected to actual screw-machine operations. The simplified test proved to be accurate. A material which gave fine, well-broken chips in the test performed similarly in the screw machine, although marginal alloys might show a reversion to long, stringy chips in critical operations.

Subsequent measurements made by means of a specially adapted Charpy impact machine, a dynamometer tool of the Boston type, and Croft's sawing test, indicated that the chip size was a much better criterion of free-cutting properties than power or tool wear measurements.

Now that the production of free-cutting aluminum alloys was an actuality, it was found that the concentration of lead required for satisfactory machineability in the commonly used strong alloys was too high for the practical production of ingots uniform in chemical composition.

Multiplicity of Elements Gives Better Machineability

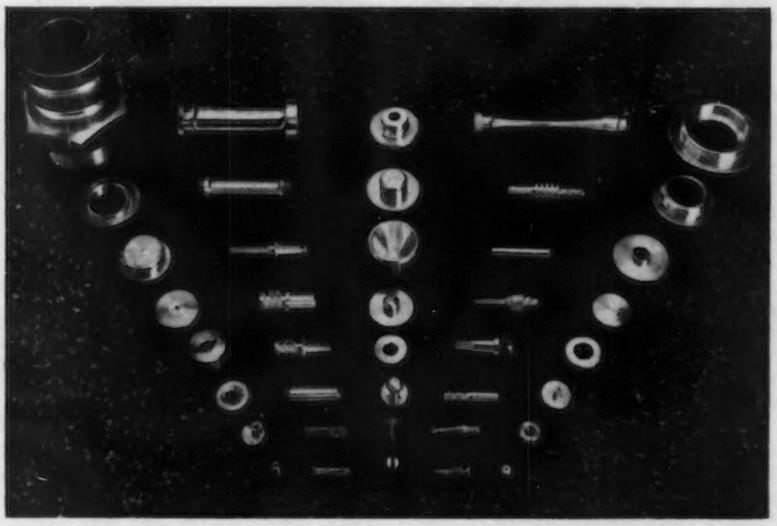
A solution of the problem consisted in the discovery that the simultaneous presence of small concentrations of a multiplicity of elements was much more efficient in producing satisfactory machineability than any one element alone. From a number of elements found to be satisfactory, lead and bismuth were chosen to supply the multiplicity because it was further found that these elements had relatively small effect on the other properties of the alloy. The effect of copper on machineability was also kept in mind, and its concentration was placed at about the maximum for the satisfactory hot working of large ingots. This, then, is one of a number of possible alloys having free-cutting qualities.

In the "T" temper, which is the condition of the metal after the application of both solution and precipitation heat treatments, the tensile properties do not differ greatly from those of the duralumin-type alloys or free-cutting brass. But in the "W" temper (solution heat treatment only) the alloy is a relatively soft material of excellent machineability which can be satisfactorily cold worked, while the wide range of mechanical properties offers opportunities for broad application.

Large Scale Production Studied

With the laboratory tests successful the problem of how to fabricate this new alloy on large-scale production had to be solved. But the problems of alloying and casting were overcome, and hot rolling and drawing presented no great difficulty. Soon rod of the new alloy was available in quantity lots at the Edgewater, N. J., works of Aluminum Co. of America. Here it was found that the alloy was much more free cutting than the aluminum alloys previously used, and work was initiated to develop a technique to take advantage of the potential economics offered.

The relatively low yield strength of the alloy in the "W" temper offered the possibility of cold-working operations after machining, although at the same time it presented the problem of bending during machining. Deformation and breakage during machining



SCREW machine parts, and chips, produced from free cutting aluminum rod.

were overcome by slight changes in tool design.

The "T" temper of the alloy has the advantage of higher yield and shear strengths, but a somewhat lower impact resistance. The relatively low degree of toughness appeared to be responsible for breakage during machining in some setups. Careful examination of the alloy in both tempers led to the conclusion that an alloy with a toughness corresponding to an impact resistance of 8 to 10 ft.-lb. and the cutting properties of the alloy in the "W" temper would make a desirable addition to the free-cutting alloy field.

It was found that duralumin-type alloys, which develop their optimum properties on aging at room temperature, are generally tougher for the same tensile strength than alloys which are aged at elevated temperatures. To induce aging at room temperature, magnesium was added to the aluminum-copper-lead-bismuth alloy, but this resulted in the impairment of the free-cutting properties of the alloy. The alloy in the "W" temper was found to have properties comparable to those of duralumin and free-cutting brass in both strength and toughness. In the "T" temper, involving aging at slightly elevated temperatures following a solution heat treatment, very high yield, tensile and shear strengths were obtained, although this was at the expense of some elongation and toughness.

Two Alloys, in Two Tempers, Now Available

In recapitulating it may be seen that there are now available at least two alloys, one with magnesium content, one without, in two tempers, so that there is a choice of four different materials. Considerable production experience has been accumulated in the use of all of these materials. In some applications, such as the manufacture of a counter-wheel, the free-cutting aluminum alloy rod has replaced free-cutting brass rod with no change in machine set-up, speeds, feeds or tool angles.

Tool wear on free-cutting aluminum alloys appears to be slightly higher than on free-cutting brass, but is much lower than that obtained with steel or duralumin screw-machine stock.

Although the development of free-cutting aluminum alloys represents a step forward in the history of screw-machine products, it is not to be assumed that they will displace all aluminum alloys previously utilized.

Art Museum Displays Stainless Steel Breakfast Set

o o o

THIS breakfast set, fabricated of stainless steel, is part of a modern dining room displayed at the Industrial Arts Exhibit of the Metropolitan Museum of Art, New York. The flatware and center tray are also made of stainless steel. Because of the pleasing appearance of the set considerable attention has been directed to the utility of this metal as a material for modern design. Use of stainless steel in these articles was made possible through the cooperation of Electro Metallurgical Co., New York.

o o o

Industrial Propane Used For Bright Annealing

By W. Z. FRIEND and F. LECKIE
Philgas Department, Phillips Petroleum Co., Detroit

ROTARY ELECTRIC STEEL CO. is playing an important part in the development of Detroit as a steel-producing center. It produces a line of round and hexagonal hot-rolled and cold-drawn bars and rods of standard analysis from ⅜ in. to 2½ in. in diameter and steel strip in widths from ⅜ in. to 8¾ in. Most of the company's products are sold to automobile and parts manufacturers in the Detroit district.

One hundred per cent scrap steel is being melted and cast by the conventional pouring method, although the plant is also equipped to cast by the rotary method, which it originated. By this method scrap steel is charged into electric furnaces, rapidly melted and poured into molds rotating at high speed. Centrifugal force distributes the steel to the outside of the mold, where it is cast as a circular bloom.

Special Atmosphere Prepared in Combustion-Type Controllers

Emphasis is placed on accurate control of all manufacturing processes, especially the process of bright annealing strip steel, which is accomplished in a continuous car-bottom annealing furnace of the company's own design. Coils of strip are stacked on bases, two bases to each car, and covers of light alloy construction placed over them and sealed around the bottom with sand. The annealing must be done in a carefully controlled reducing atmosphere.

Industrial propane is used to prepare the special atmosphere in combustion-type, furnace-atmosphere controllers. An inexpensive mixture of gases, suitable for many controlled-atmosphere furnace applications, is produced by the partial combustion of propane in a refractory tube filled with coarse refractory impregnated with a catalyst. The controllers can be adjusted within limits to give an output gas having an analysis most suitable for each individual application.

The major constituent of the mixture is nitrogen, but hydrogen, carbon monoxide and carbon dioxide are also present. The atmosphere used at the Rotary plant is provided by mixing and burning air and propane in the ratio of 16 volumes of air to 1 of propane. A representative analysis of the atmosphere shows the following:

	Per Cent
Carbon dioxide	6.3
Oxygen	0.0
Carbon monoxide	8.00

The volume of air required for complete combustion of 1 volume of propane would be 23.4. The low cost of the product gas is due to the large amount of nitrogen which is added by the air used for combustion. With industrial propane there is an increase in volume in the ratio of about 20 to 1, making the product gases cost about one-twentieth that of the raw material.

Positive accurate control of the air-gas ratio over the entire range of output is maintained by a motor-driven air-gas mixer. The inflow can be noted instantly, at any time, by a glance at the two visual flow meters of the rotary type. Water vapor is condensed at tap water temperature and partly removed from the outgoing gas by means of a surface cooler and trap. The remainder of the moisture is removed by passing the gas through activated alumina dryers. A compact drying unit is installed, consisting of two dryers in parallel, one of which is being reactivated while the other is in drying service. Removal of water vapor from the product gas by this means is so complete that the dried gases have a dew point of 70 deg. F.

The product gas leaves the dryer at approximately 6 in. water column, and enters a distributing line from which smaller service lines take off at numerous intervals with flexible, quick-coupling connections to the gas inlet at the bottom of each annealing base. The inlet is a pipe which protrudes vertically from the center of each base. The gases circulate up through the center of the stack, down between the outside of the stack and the cover, and out through the sand seal, burning as they emerge.

Annealing pots are mounted on cars with refractory bottoms, the

cars being moved forward every hour. The atmosphere gases are introduced to the pots after they have been in the furnace about 2 hr. and have been brought up to a temperature of approximately 1400 to 1500 deg. F. Each pot remains in the furnace for about 7 hr. The atmosphere gas is continuously circulated through the annealing pots during this entire time and also during the cooling period after they emerge from the furnace.

The appearance of the strip after annealing is completed is shown in one of the illustrations. A slight deposit of flocculent carbon is noticeable on the outside layer of metal, which can be easily blown off, leaving a shiny, clean surface. In the third stack in the photograph, the outside coil of strip has been removed, revealing the uniformly clean, bright surface of the rest of the coil. This product provides an excellent surface for the application of nickel, chromium or other metallic plating, enamel or paint, and insures longer life for the dies used in making stampings for which much of the strip is bought.

Preparations are being made at

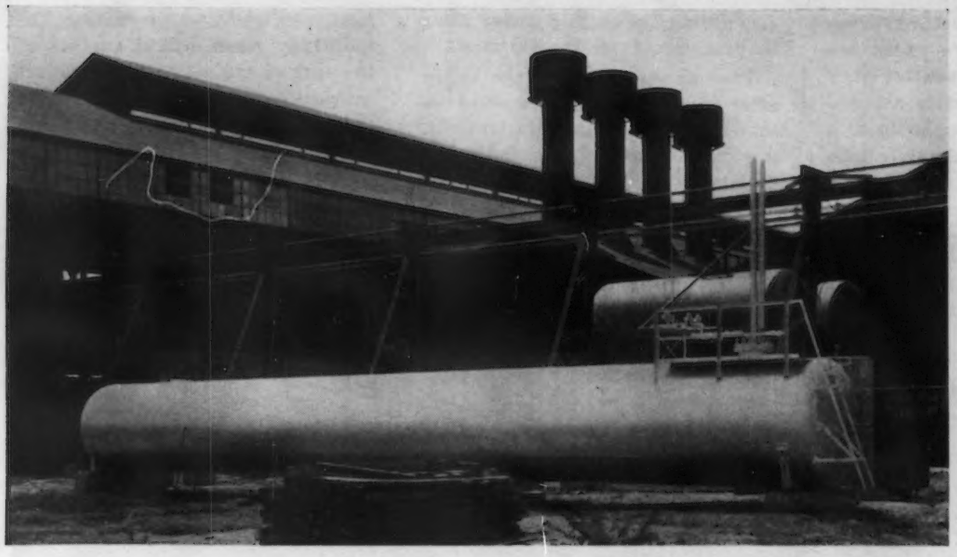
ABOVE

CHARGING end of annealing furnace. Industrial propane is used to prepare the special atmosphere in combustion-type, furnace - atmosphere controllers (seen against wall).

o o o

AT RIGHT

AFTER annealing, the outside layer of strip has a slight deposit of flocculent carbon which can easily be blown off. Note that in the third stack the outside coil has been removed, revealing the bright surface of the rest of the coil.



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INDUSTRIAL propane is shipped in special tank trucks to the Rotary Electric plant, where it is stored in the tank shown at left. Kept in liquid form in storage, it is allowed to vaporize as used and to pass as gas through piping into the building to the gas-burning appliances.

o o o

the Rotary Electric plant to extend the use of industrial propane through suitable burners for drying the ladles and nozzles used in pouring steel.

Gas Stored in Liquid Form

Industrial propane gas belongs to the series of hydrocarbon gases commonly found in natural gas. In its normal state it is a gas, but may be compressed into liquid form and held as such, under moderate pressure, to concentrate thermal value and thus facilitate transportation and storage. It possesses all the inherent advantages of natural gas as an industrial fuel, due to its uniform composition, high thermal value, and favorable combustion characteristics. From the refinery or producing plant, industrial propane is shipped in specially constructed tank trucks to the user's plant. It is kept in liquid form in storage, but as used is allowed to vaporize and pass as gas through piping into the buildings to the various gas-burning appliances.

The gas pressure may be reduced through suitable automatic regulators to the pressures most suitable for efficient operation of each appliance being served. Thus it may be employed in both high and low pressure and total premix, or partial premix, systems in the same plant, if desired, without the use of compressors. Any desired type of automatic control can readily be obtained through conventional thermostatic or other control devices.

This simplicity means that supervising, maintenance and operating costs are extremely low. A tank car normally contains approximately 9600 gal. of industrial propane; consequently a minimum-sized installation for receiving tank car shipments should have a storage capacity of 15,000 gal., so that when there is sufficient space in the plant tank to accommodate another carload, there would still be adequate reserve fuel for uninterrupted operation for a considerable time.

Industrial propane is being used as a fuel in a large number of industrial heating processes, among them being hardening, drawing, normalizing, carburizing, cyaniding, metal melting, space heating, soldering, brazing, oxy-propane cutting, lithographing, tempering, forging, upsetting, melting, enameling, japanning, drying, internal combustion engine fuel, glass melting, glass annealing, core baking and galvanizing.

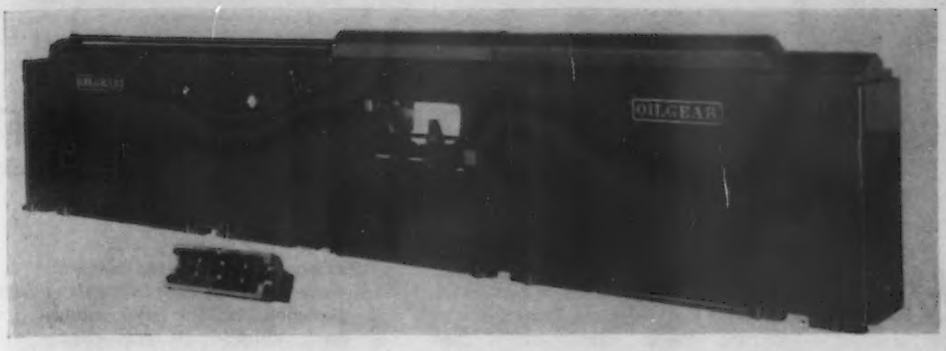
World Industrial Production Gaining

WORLD industrial production continued to advance during May, according to the monthly statement on economic conditions in foreign countries issued by the National Industrial Conference Board.

Improvement was reported in England, Canada, Australia, Germany, Italy, Belgium, Spain, Finland and in several Central and South American countries. Conditions remained substantially unchanged, according to preliminary reports, in France and Switzerland, while some recession occurred in the Netherlands, United States, and Mexico.

Unemployment declined from April to May according to preliminary reports, as follows: Denmark, 22.0 per cent; Norway, 16.0 per cent; Germany, 9.6 per cent; France, 6.7 per cent; Italy, 6.0 per cent; Great Britain, 2.6 per cent. The number of unemployed in France is estimated to have declined an additional 6.0 per cent during June. Unemployment in the United States was 0.9 per cent higher in May than in April.

World prices of important raw materials averaged 3 per cent higher during May than in the preceding month and 7 per cent higher than in May, 1934. Prices of wheat, sugar, cotton, rubber, silk, and tin advanced. Coffee prices continued to decline. During June a sharp rise in wholesale prices occurred in Italy and a more moderate rise was reported in Germany. French and English prices remained lower than at the end of May.



MAIN bearing pads on the motor block are rough and finish broached in one pass at the rate of one a minute on this special Oilgear horizontal broaching machine.

Main Bearing Pads on Packard Motor Block Broached on Special Machine

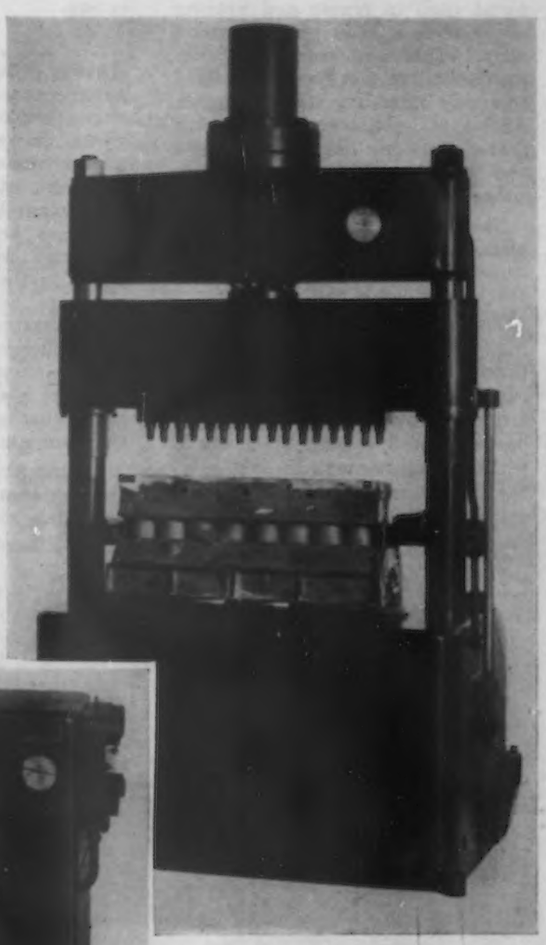
SEVERAL special machines have been installed in the plant of the Packard Motor Car Co., Detroit, in connection with production of the new eight-cylinder Packard known as the "One Twenty."

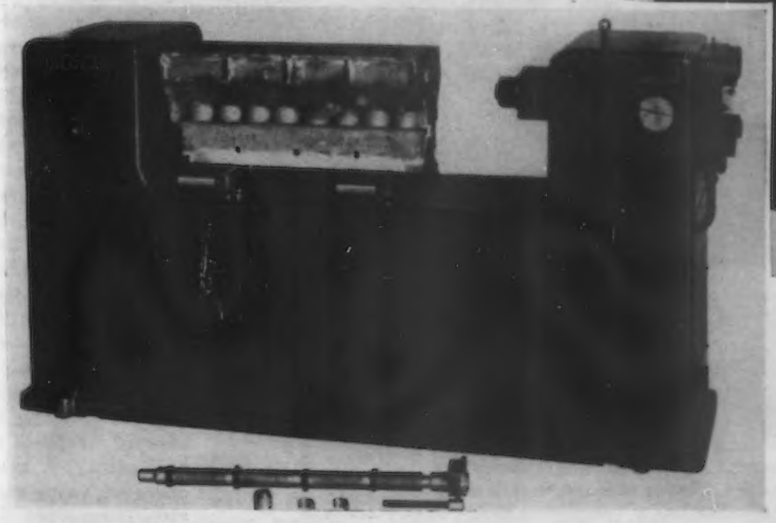
Main bearing pads on the motor block are rough and finish broached in one pass at the rate of one a minute on an Oilgear special horizontal broaching machine. The block is broached in an inverted position, being raised into place for the machining operation by a hydraulically-operated fixture. Control is semi-automatic and interlocking is provided so that the broaching operation cannot start until the block is located and clamped. By the same arrangement the broach is prevented from returning until the block is removed.

Heavy welded construction is used throughout the frame of the machine, and the Oilgear pump is mounted in the base and arranged for direct motor drive. The long tool guide attached to the ram of the cylinder mounted in the top of the machine has long ways and telescopes the cylinder on the broaching stroke. Chips fall away from the tool. Openings are provided in the base of the machine for easy removal of the chips.

The machine has a stroke of 126 in., with a maximum broach-

(CON. ON PAGE 71)





ABOVE

A 20-ton horizontal assembling press is used to assemble camshaft bushings in the block.

AT LEFT

VALVE stem guide bushings in the motor block are assembled simultaneously on a 25-ton press.

Improvements in Production

Improved Multiple-Spindle Screw Machine

AN improved multiple-spindle screw machine, announced by the Cleveland Automatic Machine Co., Cleveland, embodies a design of integral frame, bed, and cast supports for all spindle and tool-turret bearings. The metal used in frame and bearing supports is a close grained nickel alloy. This unit bolts to a one-piece cast iron pan having a baffled reservoir extending its full length. Arch-type construction of the frame provides liberal chip room and permits chip removal from either machine side or end.

The work spindle turret is a one-piece nickel alloy casting and is supported by wide turret-housing bearings at each end.

The cylindrical tool-turret casting is nickel alloy and moves forward and backward in wide bearings of the turret housing. Additional support is provided by a hardened and ground steel sleeve which passes through the center of the tool turret into the work-spindle turret and covers the center drive shaft. An auxiliary turret, provided with longitudinal T-slots, is pressed into and keyed to the main turret. The design permits the use of simple tools on jobs which, in many cases, might require a more complicated tool set-up.

Spindles

Alloy steel forgings are used in spindle construction. The spindle drive employs alloy steel helical gears, driven from a center drive shaft mounted on anti-friction bearings. On machines equipped with plain bearings, bronze bushings are pressed on the spindles and run in alloy steel sleeves, keyed in the spindle turret. Rear bearings are straight while the front bearings are tapered, providing sufficient take-up to maintain proper spindle adjustment. Tool pressure is absorbed by heavy-duty ball thrust bearings seating against the flange on the rear sleeve.

On machines equipped with anti-friction bearings, radial and axial deflection are provided against by adjustments on each spindle for close bearing adjustment. Compression collars are carried on each spindle to compensate for slight variation in bar diameters and to lessen strain on chucking mechanism.

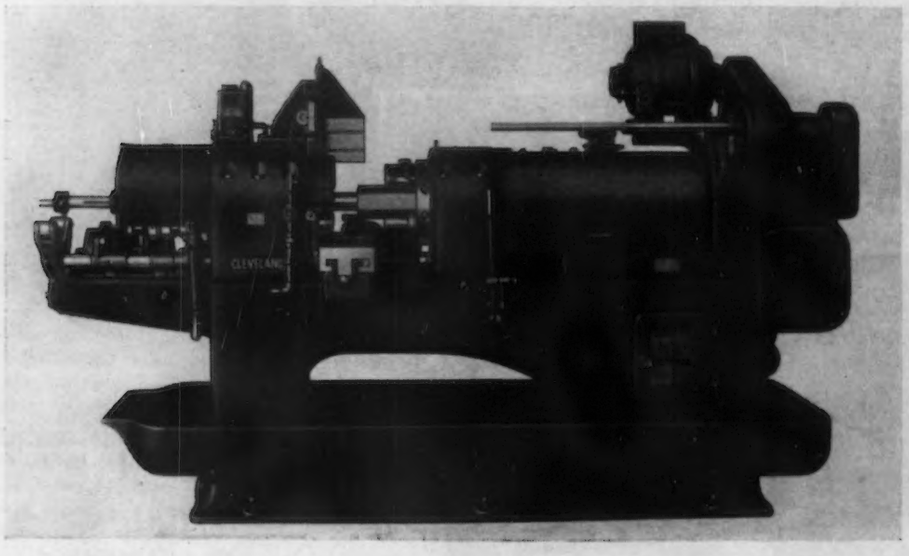
Accelerated tool spindles are employed. Their action is independent of main turret movements, although they are actuated through individual cams, bolted to the periphery of the operating drum. Operating levers are fulcrumed from a master bracket, bolted in the machine bed.

Cross-Slides

Cross-slides and elevating blocks, on which the slides operate, are nickel alloy castings, hardened and ground. Wide bearing surfaces provide rigidity for heavy forming cuts. The top slides, mounted over the work spindles, offer additional tooling provision for top-spindle operations. These slides are independently controlled by hardened steel cam bars in the slide base.

Camshafts

Two camshafts are located at the rear of the machine. These are mounted above the chip space and afford cam visibility and ready adjustment. The upper shaft carries three drums for cross-slide, tool turret and auxiliary spindles. These have jig-drilled and tapped holes for convenience in cam positioning. The lower shaft, driven from the upper shaft by helical gears, carries the work spindle indexing lever and wedge operating mechanism as well as stock feed and chuck operating drums. A safety device, serving as a driver between worm-wheel and camshaft, provides against damage in case of overload at any point. A cam-operated, swing gage stop, supported be-



ARCH-TYPE frame construction, and bearing supports cast integral with frame, feature rigidity and alinement specifications of this multiple spindle screw machine.

and Shop Equipment . . .

tween the spindle and turret housings, is fulcrumed from the machine bed. A revolving button in the arm provides for accuracy in gaging.

Two stock-feed slides operate on parallel bars, supported on the machine bed. These are provided with bronze shoes at points of tube-head contact. Stock feed is by a long coil spring. The stock reel carries the weight of the stock and revolves on roller bearings.

Tool feed is independent of high-speed geneva type indexing movement and is controlled by trip-pins carried in T-slots on the face of the worm-wheel. Feed control levers are mounted at both front and rear of machine.

A disk clutch, mounted on the driving sprocket, and provided with an operating lever at the front of the machine, transmits the driving power.

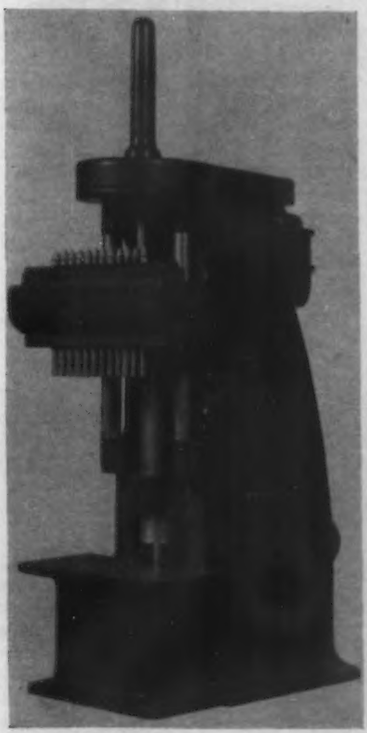
Force feed lubrication is provided for each spindle bearing. A single-shot oiling system lubricates all other bearings.

the hydraulic pump driven by a separate motor. Pump valves and oil reservoir are inclosed in the column. The sliding rail carrying the spindle units is counterweighted within the column, using cables over ball bearing sheaves.

The table is bolted to a planed column surface. The machine illustrated is equipped with 12 spindles at 2-in. centers. The spindles can be adjusted to a maximum center distance of 36 in. The approximate weight of machine is 12,000 lb.

Improved Hydraulic Boring Machine

A CYLINDRICAL-GUIDE, hydraulic-feed, drilling and boring machine built by the Moline Tool Co., Moline, Ill., is shown below. In general, the design follows standard Moline practice. Previous continuous spiral drive is retained, but is made much larger in diameter and is hollow, being supported internally on ball bearings. The larger diameter gives better tooth contact between the driving and the driven gears.



LARGE diameter, hardened and ground, cylindrical ways, accurately mounted on the column front, provide improved travel surfaces for the head of this hydraulic boring machine.

The main spiral is driven by a helical gear meshing directly into its teeth and through a train of spiral and spur gears and V-belts to the motor. The motor is mounted on the back of the machine in a vertical position and is connected through V-belts to the spline shaft in the center of the machine.

The machine is provided with hardened ways consisting of two hardened steel shafts accurately mounted on the front of the column. The supports of these shafts are smaller in diameter than the bearing surface to permit grinding the bearing surface and installing new guide bushings without disturbing the mounting. The bushings are provided with oil and dust guards both at top and bottom.

The hydraulic cylinder is accurately finished both inside and out and has a flange connection to the lower side of the rail with the stuffing box and piston rod at the lower end. The outside of the cylinder fits in a bushing rigidly supported in the column, well below the rail, so that in conjunction with the two bushings on the hardened shafts, there is provided a rigid, three-cornered support. The design also provides easy restoration of alinement in the event of wear. The hollow piston rod is stationary; the hydraulic connections are at the lower end.

Machine feed is hydraulic with

Welded Press Frames For Replacements

THE Quickwork Co., St. Marys, Ohio, has developed a design of welded steel press frame for simplifying the problem of broken frame replacement.

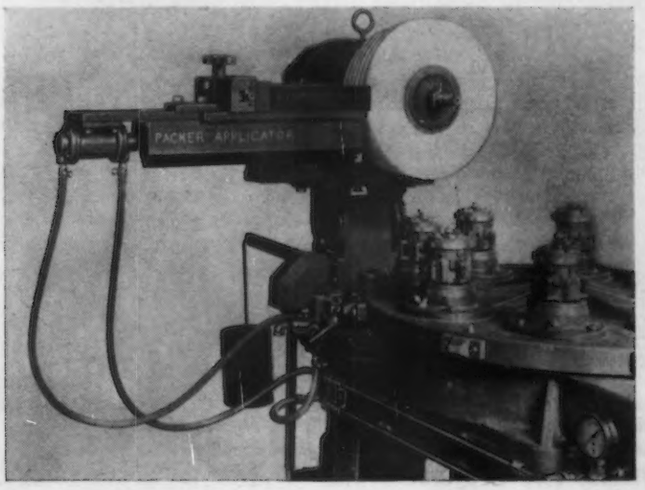
The side members are box sections serving to provide complete frame with a minimum of weight. The illustration below is of this welded construction as applied in the building of an inclinable press frame.

Welding Manipulator Requires No Crane

A WELDING manipulator announced by the United Engineering & Foundry Co., Pittsburgh, is said to permit positioning all heavy work involved in welding operations so that fillet welds of correct radius can be made without waste of electrode metal. Savings of 25 to 40 per cent in welding time are claimed. In operation, the manipulator requires no overhead crane as its design permits of either rotating or tilting a master face plate on which the work is balanced and to which the work is attached. To this extent the manipulator may be said to be portable. Operation is by a Lincoln Electric Co. electric motor, controlled by push buttons attached to an extension cord. Different buttons control positioning as desired. Operators ride with the work as it is brought into varying positions. Capacity of the manipulator is from 5 to 7 tons. Center of gravity is a factor in capacity, as is evident by reference to the illustration above.

Automatic Feeder for Buffing Compound

PACKER MACHINE CO., Meriden, Conn., has developed and is marketing an automatic applicator for feeding composition to the buffing wheels of the company's automatic polishing and buffing machines. The device, on which patents are pending, is illustrated below. It can be used on either rotary or straight-line equipment. Compressed air to a maximum of 60-lb. pressure is employed as operating force. Cakes up to 11 in. long, 6 in. wide, 1½ in. thick can be used. Cam operation is governed by the travel of the work table. No operating attention, other than loading is required.



Pull-Lift Device for Industrial Use

A NEW device, incorporating two purpose use, lifting and pulling, is announced by Yale & Towne Mfg. Co., Philadelphia division, Philadelphia. Load hooks are of heat-treated forged steel and can be positioned for either lifting or pulling operations. Weston type of self-actuating load brake holds the load firmly at all times regardless of whether the application to work be of a vertical or horizontal nature. Used vertically as a hoist, capacities are specified as ¾, 1½, 3 and 6 tons. Ratchet and pawl are used on the smaller models. Gear reduction is employed for the larger capacities. All moving parts are inclosed for operation in grease. The same factors of safety are employed as are common to the standard Yale line of super-geared chain hoists.

Self-Contained Devices For Metal Marking

QUALITY DIE CO., South Chicago, Ill., announces two new type hand machines for the marking of metal and metal products. The devices are pictured below.

One machine contains all letters of the alphabet and the numerical digits 1 to 0 on a single wheel. A single character is impressed at a time, but by simply turning the wheel, any combination of figures and letters may be stamped.

Accuracy in stamping is secured by a guide opening in the face of the machine, through which appears a duplicate of the character to be impressed. Grooves in the base of the machine serve as guides for the placing and alining of characters on the surface to be stamped.

The second machine (illustration B) is of multiple wheel type. It is supplied with any number of wheels from 2 to 9 or more, each wheel containing 10, 12, or 14 characters, either figures or letters or both. By turning the wheels the characters to be impressed can be arranged in a single straight line in any combination. Special characters can be engraved to order.

Grooves cut into the face of the wheels between the deeply engraved characters fit over a small pin, which insures perfect alinement and acts as a reinforcement to a large shaft pin. Both pins are made of tool steel, hardened to withstand the heavy pounding necessary to impress the characters into hard metal. Characters are kept in alinement by means of ratchets for each wheel.

A guide plate enables the user to place the impression just where he wants it and makes possible a uniform impression of all characters. The grooves on bottom are guides in marking convex surfaces.

In both the single wheel machine and the multiple wheel, the shank holder moves downward when marking through the base guide and goes back into place automatically after the impression is made.

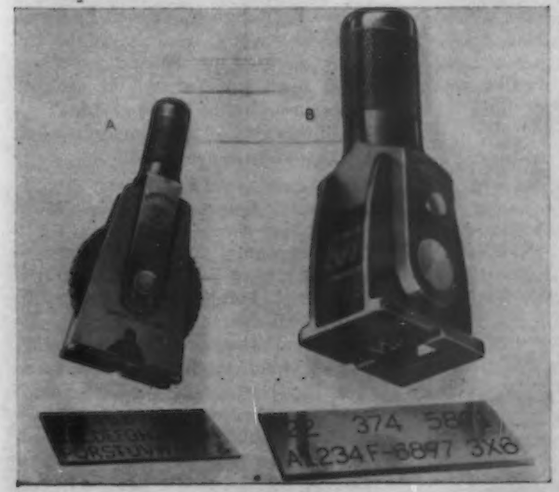
Both machines are said to be capable of impressions in metals up to and including Brinell hardness No. 415, and equally effective on fiber, leather, wood, and other materials.

Vise Belt Lacer

A VISE belt-lacer in 4 and 6-in. models, is announced by Clipper Belt Lacer Co., Grand Rapids, Mich. Belts up to ⅜ in. thick are

laced in one operation through use of a special vise attachment. The attachment is said to permit of a "Clipper" joint as satisfactory as produced by the most powerful machine.

The illustration above is of the equipment as used.



MARKING devices, shown at the left, constitute complete units, easily operated and handled, for hand marking.

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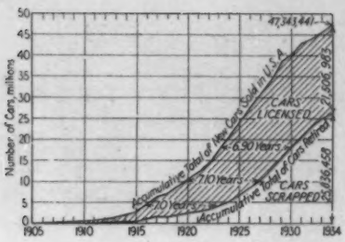
ELIMINATION of any destructive action by flow-force is said to be attained by distribution of the force as provided for in the design of the valve at the right.

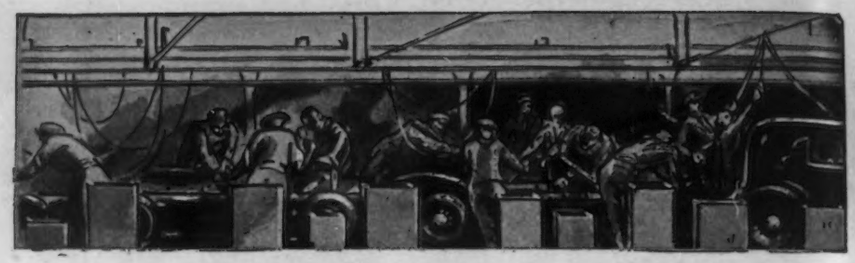
New Plug Type Valve Distributes Flow Force

THE valve illustrated below has been designed by the Fairbanks Co., 393 Lafayette Street, New York, for service where there is excessive wire drawing or destructive action of any kind on valve seat or disk, such as when used for drip, drain, throttling, etc. A long seating surface is provided between the plug and the seat, and if the surfaces become scored or cut they can readily be reground or renewed. The angle of the plug and seat-ring sealing surfaces provides that the flow is uniformly distributed when passing between these components. The makers state that the force of the stream cannot be concentrated on any part of the plug or seat and produce erosion or wire drawing. The seat ring is screwed into the diaphragm, providing easy removal. Both seat and disk are made of special nickel alloy. Regrinding does not require removal

of the valve from the line. A spindle shoulder affords a back seat which permits packing the stuffing box under pressure with the valve wide open.

Power Transmission Equipment. Medart Co., 3500 De Kalb Street, St. Louis.—Catalog 56-T containing full details regarding the company's line of transmission equipment. Included are bearings, belts, pulleys, rope drives, shafting, special machinery and many other products.





THIS WEEK ON THE

Ford Places Large Steel Orders; Other Auto Makers Soon to Buy Steel

SCARCELY ever has Detroit contemplated a new model season with greater enthusiasm than it looks upon the period immediately ahead. If earlier in the year the automobile industry felt that it had secured a foothold on the prosperity ladder, it now is confident that its grip is so tight that nothing short of a national calamity will dislodge it.

Orders for steel for 1936 cars are materializing several weeks before the trade had expected them, with Ford, Buick, Nash, Packard and Oldsmobile leading the procession. Purchases of new equipment reflect the industry's optimism over the outlook for the coming year. The industrial employment index of the local Board of Commerce stood at 90.7 on July 15, an 8 per cent increase over a year ago and only 6.5 per cent below the middle of June.

Retail sales are showing a vigor which promises good business, despite the imminence of new models and the adverse effects of the vacation season. Car manufacturers have their attention riveted on the farm market, which should provide a substantial volume of buying as crops are harvested. One company says that "the farmer has become one of America's best spenders this summer," principally because prices of farm products are increasing faster than prices on commodities the farmer has to purchase.

Sales To Farmers Large

Plymouth's sales to farmers, dairymen and ranchers increased more than twice as fast as total new car sales during the first four months of 1935. A prominent automotive executive comments that "the farm market is just beginning to open up. The surface has just been scratched." H. G. Moock, vice-president of Plymouth, explaining the barrage of farm buying, points out that "in May, 1932, it took 1556 bushels of wheat to pay for a $660 Plymouth sedan. The same purchase can be made today with only 751 bushels."

It appeared a few weeks ago that new car production during August would be exceedingly slim, but plans of several companies will considerably fatten the volume. Chevrolet, still facing the problem of a car shortage in some parts of the country, is scheduling around 100,000 units next month, and incidentally will be assembling 1935 cars through most of September. Chrysler divisions will continue to build current models until late in August, in line with their decision to manufacture more 1935 cars than originally planned.

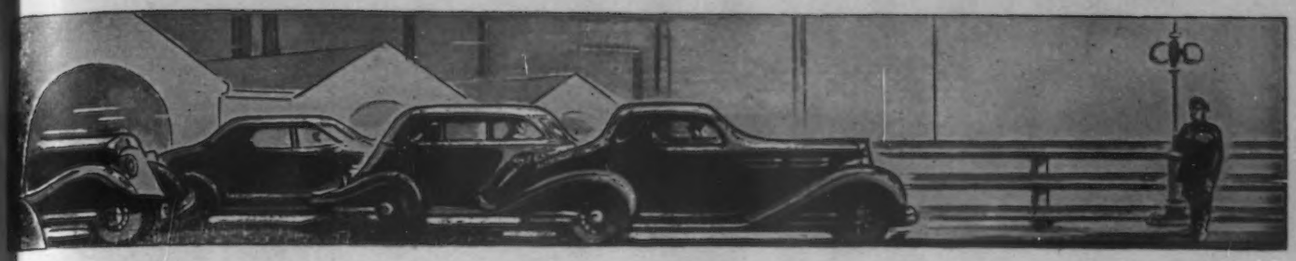
Buick, hoping for a 30 to 35 per cent expansion in operations the coming season, is reported to be committed to an output of 8000 cars in August and about the same number in September as it stocks dealers with its new series. Buick is understood to have decided to retain four lines of cars, but only two motors will be manufactured. Public announcement is said to be set for late September.

Ford's Rouge plant will be down from the night of July 26 to the morning of Aug. 12 and suppliers have been notified not to deliver materials during that period. Work will be begun on 1936 models when operations are resumed.

Fourth Quarter Looks Good

The automotive industry is contemplating a prosperous fourth quarter. It anticipates that retail sales will be so good during the summer that the break in production between models will be exceptionally short. One should remember that the longer car manufacturers can build and sell 1935 models, the lower is the unit cost and the higher the profit per car. Af-

THE Iron Age has been given special permission to publish the chart in the upper left corner of this page which was prepared by E. W. Oliver, director of research and service, St. Louis Southwestern Railway Lines, and is copyrighted by him. The increase in the length of life of passenger cars since 1932 is the result of the tendency of owners to continue to drive older models during the depression. The author points out that if the popularity of the three low-priced cars continues, having already risen from 56 per cent of total sales in 1929 to 72.4 per cent in 1934, then by reason of their low price the average normal life of cars generally should be somewhat shorter in the future than during the years prior to 1929, when more expensive cars had a higher percentage rating in total sales.



ASSEMBLY LINE

BY BURNHAM FINNEY
Detroit Editor, The Iron Age

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ter several years of shriveled dividends and actual losses, they are eager to rehabilitate their earnings.

Confidence in what the remainder of the year holds for the industry has taken the form of large steel orders, including around 35,000 tons of sheets, placed by Ford for delivery in August. Ford is expected to be in the market again for steel late next month and will buy substantial tonnages for the final quarter over and above current purchases.

Fisher Body has its new sizes of steel ready and this week should give releases for important tonnages. Buick, already having bought one round lot of steel for itself and another for Oldsmobile parts, will shortly give additional business to steel mills. Packard, operating at full capacity, has been taking in a considerable amount of steel. Altogether, the steel trade is getting today much tonnage which it did not anticipate securing until mid-August. Great Lakes Steel, running its open-hearth furnaces at full capacity, is reported to expect no break in this schedule through the rest of 1935.

Plymouth Reaches Out

Having increased its activities almost miraculously during the depression, Plymouth is now at the point where it needs assembly plants around the country. It has a plant at Los Angeles which, it is said, will hardly take care of its requirements long if sales continue to grow as they have in the last year or two. It is now establishing an assembly plant at Evansville, Ind., to serve the South and Southwest. Plymouth is understood to be investigating the possibilities of putting an assembly plant in the East, probably near Baltimore. The advantages of branch assembly plants are not alone in the increased capacity which they give, but in the profit to the manufacturer from so-called equalized freight on finished cars.

Part of Chevrolet's profit, for example, comes from charging the purchaser in the Baltimore area the freight from Flint to the customer's home, although the car is assembled in Baltimore and the freight on the "knocked-down" material shipped to the assembly plant is far less than on the finished car. Plymouth has been battling against this handicap ever since it started to challenge the two leaders. In case of a price war it would be at a material disadvantage. The policy which it has begun of acquiring branch assembly plants will strengthen its position.

Equipment makers, in some cases, are more concerned at the moment about deliveries than about further orders from the automotive field. The volume of equipment business is bringing smiles to the faces of builders. Ford apparently is not yet through placing orders for England and France. Chevrolet is in the midst of the biggest program in years. It has bought much of the machinery for the gear and axle plant and also some of the equipment for Saginaw, where it will make transmissions as well as other parts. Observers are wondering what part the Toledo plant will play in Chevrolet's scheme of things the coming year, when transmissions will be built at Muncie and Saginaw. What with trouble at Toledo, Cleveland and Norwood, General Motors is pretty well fed up with the whims and fancies of Ohio labor.

Warner Gear is understood to have perfected a new transmission for 1936 Chryslers and De Sotos which incorporates the overdrive. It has purchased some machinery for the production of this new unit, insisting on rush deliveries. During the past year it has been making the overdrive unit for Chrysler, which has been built separate from the transmission.

Packard, flushed with the success of its 120 models, is said to be contemplating the addition of two new lines for 1936. One would be in a price class to compete with Buick's 40 series, which starts at $795, and the other in a class above that of the 120. It is possible that Packard may purchase some new equipment to increase its productive facilities. During the second quarter Packard built 17,040 cars and made a net profit of $1,400,000, or $82 a car.

Cadillac's new V-eight motor, with the V-block cast in one piece, will be standard equipment in its 1936 cars. The block will be cast in the Cadillac foundry. Cadillac is reported to have closed permanently its aluminum foundry.

Rust Proofing Gets Attention

Automobile makers intend to put more money next year into rust-proofing metal parts. The rusting of fender edges because of the use of chemicals on roads in winter to melt ice is said to have brought many complaints to some companies. Moreover, improved processes have recently been developed to eliminate the rusting of steel exposed when the enamel finish is broken. Chevrolet next year will join the ranks of cars which are rust-proofed. Nash has installed at its Kenosha plant a "Spra-Bonderizing" system for the treatment of fenders, hoods, running boards, rear wheel shields and radiator splash aprons for Nash and LaFayette cars. The equipment is capable of rust-proofing 25 cars an hour.

Assemblies this month still are estimated at 275,000 units. It is too early to forecast the August total, but it should reach respectable proportions with such companies as Chevrolet, Packard, Buick and Chrysler divisions on good schedules.

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Bigger Savings Better Profits

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Today's Industrial Prospectors are seeking out their jobs which afford an opportunity for Bigger Savings. At the same time it is essential to select the Best method for Turning these jobs into Better Profits.

Bullard Type "D" Mult-Au-Matic for those heavier jobs—Type "J" Small Mult-Au-Matic for the small high-speed work—and Single Spindle Vertical Automatic Lathe present the solution to many problems and afford a means for Profitable manufacturing.

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From Machines

into Tills and Coffers of Business

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It pays to prospect. Let Bullard Engineering Service assist in your search for this flow of Profits. Let Bullard Engineers Estimate your Jobs and Turn them into Increased Profits. At your service—

BRIDGEPORT, CONNECTICUT

NEWS OF THE WEEK

Plans for Metal Congress Now Almost Complete

OUTSTANDING leaders in the metal world will take an active part in the technical program for the Seventeenth National Metal Congress and Exposition, to be held in Chicago the week of Sept. 30.

This is indicated with the program for the five cooperating Societies almost completed. The Societies participating in this year's Metal Show are the American Society for Metals, the American Welding Society, the Wire Association, and the Institute of Metals Division and the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers.

In the course of some forty morning and afternoon sessions during the five-day period, more than seventy-five papers dealing with every phase of the metal industry will be presented. Over a hundred subjects will be discussed by men whose names are synonymous with the latest developments in the science and art of metals.

There will be sessions devoted strictly to research and others dealing with practical shop problems, service tests of materials, melting practice, tool steels and alloys. The program is so arranged that visitors to the Congress will be able to attend all the sessions in which they are particularly interested.

Headquarters for the Congress will be maintained at the Palmer House, where morning sessions will be conducted. Afternoon sessions will be held at the New International Amphitheatre, where the Exposition will be located.

This year's Exposition has already far outstripped the 1934 New York Show, and promises to be the largest in over five years. Twenty-five per cent more space has been reserved at this time than at the opening of last year's exposition, and the 1935 Show is still more than two months away.

At the outset, only the main exhibit hall and one wing of the huge International Amphitheatre were laid out for display space. However, reservations have been so great that the entire space in the amphitheatre—more than 164,000 square feet—is now being devoted to exhibits.

More than one hundred and sixty exhibitors have reserved space at the Exposition. All the important steel companies, most of the nonferrous producers and makers of machines and methods used in the metal industry will be represented at the coming show.

Stacks Dismantled At Cleveland

AMERICAN STEEL & WIRE CO. is dismantling two of the four blast furnaces of its Central furnace plant, Cleveland. None of the Central furnaces has been operating for about ten years. When in blast they supplied metal for the Newburgh Steel Works, the operations of which were discontinued in January, 1933. Since then the Cleveland plants of the American Steel & Wire Co. have been supplied with billets from the National Tube plant in Lorain.

The company has made no decision as to whether the operations of the Newburgh steel plant will ever be resumed, but in case they are, the capacity of the two remaining Central furnaces will be sufficient to supply all the iron needed for the open-hearths of the Newburgh works.

The two furnaces that are being dismantled are Stacks A, built in 1900, and C, built in 1887, both having been rebuilt at later dates.

General Electric Had Gain in Orders

ORDERS received by the General Electric Co. during the first six months of 1935 amounted to $104,542,946, compared with $92,154,642 for the first six months last year, an increase of 13 per cent.

Sales billed during the first six months of 1935 amounted to $94,546,273.80, compared with $80,983,093.60 during the corresponding period last year, an increase of 17 per cent.

Profit available for dividends on the common stock for the first six months of this year was $11,541,428.78, compared with $8,175,557.22 for the first six months of last year. This is equivalent to 40c. a share for the first six months of 1935 and 28c. a share in the first six months of 1934.

G. E. to Concentrate Air Conditioning

GENERAL ELECTRIC CO., Schenectady, N. Y., will concentrate manufacture of air-conditioning equipment in future at its plant at 5 Lawrence Avenue, Bloomfield, N. J., where part of works formerly given over to production of electrical control devices will be used and expansion carried out. All divisions of air-conditioning department will be consolidated at new location, including engineering and service units.

Business in June Showed Contra-Seasonal Up Trend

BUSINESS activity during June registered a slight improvement over the preceding month and remained considerably above the levels of the corresponding month of 1934, according to the National Industrial Conference Board. In the field of production greater-than-seasonal rises were reported by the construction, petroleum, coal, electric power, and machine tool industries. Distribution, as represented by miscellaneous freight traffic and retail sales, showed considerable improvement over that reported for May, 1935.

Industrial activity during the first sixth months of the year was markedly greater than during the corresponding period of last year. Of the more important indexes of production and of distribution only two—total carloadings and steel production—were lower during the first half of 1935 than a year ago. The percentage changes in the major industries in the first half of 1935 compared with the same period of 1934, as computed by the Conference Board, are shown in the following table:

Indexes of production:	
Automobiles	+31.1%
Steel ingots	— 1.6
Residential building	+58.0
Petroleum	+ 5.8
Bituminous coal	+ 3.7
Machine tool orders	+46.5
Electric power	+ 5.2
Indexes of distribution:	
Total carloadings	— 1.7%
Miscellaneous carloadings	+ 0.6
Department store sales (volume)	+ 4.0

Substantial gains have been registered in residential building, in automobile production, and in orders for machine tools. Demand for these goods is highly cyclical in character and the impressive rise of the past six months indicates that the shortages which have long been known to exist in such durable consumers' goods as houses and automobiles and in production machinery are at last beginning to make themselves felt.

Both wholesale and retail prices advanced measurably during the first half of 1935. The advance in wholesale prices was approximately 3.5 per cent. The National Industrial Conference Board's index of retail prices stood at 75.5 per cent of the 1926 average in December, and by June of this year had risen to 78.0 per cent, or an increase of 3.4 per cent.

Corporate security prices also advanced during the first half year. Common stocks averaged 8 per cent higher in June than in December, 1934; corporate bond prices advanced 0.5 per cent over the same period. Prices of Government issues, however, showed little change.

New capital flotations during the first half of 1935 aggregated $2,020 million, exclusive of United States Government issues but including issues marketed by governmental agencies. This is the heaviest volume of financing done since the first six months of 1931. Of the total new issues, however, only a small amount—slightly more than $100 million—represented new capital for private industry. This amount was approximately the same as for the first half of the year 1934, and lower than for either 1932 or 1931.

Exports of merchandise for the first five months of 1935 amounted to $835,763,000 or 1.7 per cent less than in the corresponding period of 1934. The decline was greatest in the raw material and food classifications; exports of semi-manufactured goods were approximately the same as last year. Sales abroad of finished manufactures were about 12 per cent higher than in the first five months of 1934. Thus, the greater part of the decline occurred in agricultural products, with non-agricultural exports apparently higher than last year.

Merchandise imports from January to May aggregated $829,145,000, or 19.1 per cent higher than during the first five months of 1934. Increases were general in all of the major classes of imports. Of the total exports up to the end of May, 1935, 28.2 per cent were agricultural and 71.8 per cent were non-agricultural commodities. Of total imports during the same period, 56.4 per cent were agricultural and 43.6 per cent were non-agricultural.

Construction Institute Reopens Offices

THREE district offices have been reopened by the American Institute of Steel Construction. At the same time a realinement of district territories has been put into effect. This step was authorized by the directors in the anticipation of improved business and a greater inquiry on the part of private buyers of fabricated structural steel.

The new district offices are located at Atlanta, St. Louis and Dallas, Tex. Earlier this year the institute reestablished its New England office at Worcester, Mass., and again placed E. N. Adams in charge. Mr. Adams served the institute in the same capacity from 1927 to 1932. C. R. Bloxton is in charge of the office at Atlanta; Robert J. Wood at St. Louis and L. H. Dodd at Dallas. Mr. Dodd represented the institute at Dallas from 1928 to 1932. Mr. Bloxton, until coming with the institute, was bridge engineer with the Tennessee Valley Authority, and Mr. Wood has had experience in shop fabrication practice and general contracting in the Mississippi Valley.

This will give the institute nine district offices outside of the executive offices in New York. The others are located at Chicago, Philadelphia, Cleveland, Topeka, Kan., and San Francisco.

Large Electrical Control Order

CUTLER-HAMMER, INC., Milwaukee, reports an order for control equipment valued at $225,000 from the Great Lakes Steel Corpn., division of the National Steel Corpn., which represents the largest single installation order the Milwaukee concern has ever booked. The contract calls for all auxiliary apparatus, limit switches, clutches, safety switches and crane control equipment for the new continuous hot strip mill and cold mill under construction at the Ecorse works, Detroit. Delivery is to be made before Jan. 1, 1936.

Armco Cold Mill Is Placed With United

THE United Engineering & Foundry Co., Pittsburgh, has received contract from the American Rolling Mill Co., Middletown, Ohio, for an 80-in. four-high strip continuous mill, which will be engaged in the manufacture of automobile sheets and other similar highly finished products. The American Rolling Mill Co. will spend about $4,000,000 for the complete installation. The mill will have a capacity of 20,000 tons a month and will probably be ready for operation early next year. The mill will be equipped with several new features in mill machinery construction which have been developed by the United Engineering & Foundry Co.

Iron and Steel Imports up Sharply—Exports Gain

Exports (In Gross Tons)	May		Five Months Ended May	
	1935	1934	1935	1934
Pig iron	248	478	1,004	1,626
Ferromanganese	1	....	34	14
Iron and steel scrap	209,425	132,725	900,844	595,733
Tin plate scrap[5]	6,583	....	20,172	....
Waste-waste tin plate[5]	4,941	....	12,555	....
Pig iron, ferroalloys and scrap	*221,198*	*133,203*	*934,609*	*597,373*
Ingots, blooms, billets, sheet bars	1,675	2,452	26,502	4,612
Skelp	2,724	31,882	6,236	36,809
Wire rods	1,150	2,083	8,794	13,259
Semi-finished steel	*5,549*	*36,417*	*41,532*	*54,680*
Steel bars	4,364	4,427	22,272	19,040
Alloy steel bars	164	344	1,032	1,585
Iron bars	124	262	561	508
Plates, iron and steel	2,961	2,717	16,199	13,877
Sheets, galvanized steel	7,445	4,629	31,481	25,900
Sheets, galvanized iron	111	187	624	693
Sheets, black steel	9,363	8,147	43,659	33,135
Sheets, black iron	653	455	2,554	1,552
Hoops, bands, strip steel	3,508	2,732	18,159	13,664
Tin plate and taggers' tin	7,349	10,541	46,535	86,931
Terne plate (including long ternes)[5]	175	....	1,196	....
Structural shapes, plain material	2,699	4,932	12,395	12,223
Structural material, fabricated	2,011	1,231	9,843	7,700
Tanks, steel	413	143	2,550	3,421
Steel rails	2,117	5,311	12,563	40,889
Rail fastenings, switches, spikes, etc.	544	889	3,786	10,076
Boiler tubes	1,404	676	4,451	2,738
Casing and oil line pipe	1,165	8,677	15,150	28,515
Pipe, black and galvanized, welded steel	2,158	3,442	17,148	19,317
Pipe, black and galvanized, welded iron	253	420	1,628	998
Plain wire	3,055	3,054	14,315	15,418
Barbed wire and woven wire fencing	2,122	3,544	12,866	15,620
Wire cloth and screening	83	93	395	317
Wire rope	296	236	1,794	1,199
Wire nails	688	1,402	4,227	5,905
Other nails and tacks	274	421	1,534	2,162
Other wire and manufacturers	364	405	2,122	1,954
Bolts, nuts, rivets and washers, except track	595	436	2,838	2,004
Other finished steel	154	185	585	687
Rolled and finished steel	*56,612*	*69,938*	*304,462*	*368,118*
Cast iron pipe and fittings	1,346	499	6,160	4,974
Malleable iron screwed fittings	287	247	1,345	1,256
Carwheels nad axles	380	239	10,912	1,504
Iron castings	697	597	3,706	3,403
Steel castings	161	168	1,105	809
Forgings	369	441	2,416	1,647
Castings and forgings	*3,240*	*2,191*	*25,644*	*13,593*
Total	286,599	241,749	1,306,247	1,033,764

Imports (In Gross Tons)	May		Five Months Ended May	
	1935	1934	1935	1934
Pig iron	23,174	8,628	46,903	60,218
Sponge iron	50	111	462	432
Ferromanganese and spiegeleisen[1]	4,633	3,422	18,375	13,296
Ferrochrome[2]	....	14	1	34
Ferrosilicon[3]	25	87	466	233
Other ferroalloys[4]	....	33	1	33
Scrap	823	6,975	9,639	23,748
Pig iron, ferroalloys and scrap	*28,705*	*19,270*	*75,847*	*97,994*
Steel ingots, blooms, etc.	34	60	1,004	395
Wire rods	1,750	1,236	6,452	5,355
Semi-finished steel	*1,784*	*1,296*	*7,456*	*5,750*
Concrete reinforcement bars	190	90	508	417
Hollow steel bars	92	64	405	260
Merchant steel bars	843	1,923	7,506	7,315
Bars, whether solid or hollow[6]	1,894	....	1,894	....
Iron slabs	....	....	....	1
Iron bars	48	48	317	295
Boiler and other plate	....	22	73	71
Sheets, skelp, and saw plate	622	174	2,696	2,053
Tin plate	17	25	100	32
Structural shapes	3,686	1,946	13,087	8,081
Sheet piling	....	443	....	443
Rails and rail fastenings	379	201	1,459	1,099
Welded pipe	175	54	554	746
Other pipe	1,337	141	4,942	1,624
Cotton ties[5]	1,474	....	1,743	....
Other hoops and bands	2,276	1,356	8,557	5,961
Barbed wire	1,900	1,333	10,978	4,528
Round iron and steel wire	388	260	1,696	1,130
Telegraph and telephone wire	6	....	13	2
Flat wire and strip steel	134	92	706	578
Wire rope and strand	98	55	797	587
Other wire	57	3	397	223
Nails, tacks, and staples	1,441	456	6,950	2,630
Bolts, nuts, and rivets	37	35	142	154
Horse and mule shoes	61	52	318	165
Rolled and finished steel	*17,155*	*8,773*	*65,838*	*38,395*
Malleable iron pipe fittings[5]	....	....	46	....
Cast iron pipe and fittings	....	4	....	7
Castings and forgings	75	128	496	617
Total, gross tons	47,719	29,471	149,683	142,763

[1] Manganese content. [2] Chrome content. [3] Silicon content. [4] Alloy content. [5] New class—no comparable figures for 1934 and previous years. [6] New classification as result of reciprocal trade agreement with Belgium—no comparable figures for previous month or year.

WASHINGTON, July 19.—May exports and imports of iron and steel products both showed substantial gains over the preceding month's totals, as reported in THE IRON AGE, July 4, page 67, and July 11, page 106.

The gain in imports had been expected in view of the fact that May was the first month in which the Belgian-American reciprocal trade agreement had been in effect. However, the May total of 47,719 tons included 23,174 tons of pig iron on which there was no tariff change, while in April only 8247 tons of the total of 28,866 tons was iron. Gains were registered in structural shapes and merchants bars on which duties were reduced.

The export total of 286,599 tons compared with 205,336 tons in April and 241,749 tons in May of last year. Scrap accounted for 209,425 tons of the May total this year, compared with 131,731 tons in April and with 132,725 tons in May, 1934.

Sources of American Imports of Iron and Manganese Ores

(In Gross Tons)

	May			
	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1935	1934	1935	1934
Canada	....	167	....	....
Cuba	44,500	22,000	....	....
Chile	22,350	152,758	....	....
Spain	11	200	....	....
Norway	24,398	7,467	....	....
Sweden	....	....	....	....
French Africa	....	6,600	....	....
Russia	....	7,500	8,873	10,431
India	....	....	557	1,988
Brazil	....	....	....	958
West Africa	....	....	2,573	....
Other countries	*17,206	5,404	204	3,955
Total	108,465	202,096	12,207	17,332

*Includes 15,292 tons from Australia.

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	May		Five Months Ended May	
	1935	1934	1935	1934
United Kingdom	10,101	50	10,301	150
British India	2,743	1,902	8,543	15,017
Germany	....	....	....	....
Netherlands	7,361	5,247	17,401	39,324
Canada	486	836	5,221	3,935
France	....	....	50	....
Belgium	....	....	100	50
Norway	....	391	1,610	793
Sweden	....	25	340	225
All others	2,483	177	3,337	724
Total	23,174	8,628	46,903	60,218

THIS WEEK IN WASHINGTON

Heat unabated—when a dog chases a cat in Washington they both walk.

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States and municipalities will supplement Federal allotments for work relief. Outside of CCC, new job program had put 15,000 to work by end of first week in July.

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Graduated corporation income tax likely to be replaced by excess profits impost. Business will benefit if latter stimulates capital goods expenditures.

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First voluntary code is submitted to Federal Trade Commission by wholesale tobacco trade.

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NRA payroll is reduced $2,500,000 a year . . . Guffey coal bill, of doubtful constitutionality, still held up in committee.

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By G. L. LACHER
Managing Editor, The Iron Age

o o o

WASHINGTON, July 23.—No one is walking a mile for a Camel in the national capital these days . . . or even a block. The merciless mid-summer sun and the steaming Potomac make a combination that is torrid in the extreme. . . . Popular haunts of the news hounds here are the executive offices of the White House, the Department of Labor building and the Interstate Commerce Commission building, all of them air-cooled . . . likewise some of the individual offices of important officials in other departments, which are also air-conditioned. No one who has experienced the relief of a few minutes in these places of refuge from Washington heat and humidity can doubt that air-conditioning is one of our major coming industries.

The pons asinorum

Somehow it seems inappropriate to ponder over the prospects of air-conditioning or any other business in Washington. Business and especially "big bizness" are unpopular here. On the Pacific Coast, Secretary Wallace assailed our business oligarchies who "consider it proper for enormous economic power to be concentrated in their hands." In this city, a Congressional investigation disclosed that there are still some lobbyists who enter Washington over the *pons asinorum*. Was it not enough that millions of men and women, most of them small investors, were genuinely alarmed about the safety of their utility securities without resorting to scandalous and dishonest tactics? It is, of course, beside the point to note that this scandalous performance was the work of a few minor utility officials. The Administration sought a goat and promptly found one.

Wages of Capital Sinking

Anyhow, lobbies are in bad favor here unless they represent the farmer or organized labor. Anyone with a good word for business is immediately suspect. . . . But this should not be surprising during an Administration which has been spending other people's money in unprecedented amounts. The Federal debt has passed $29,000,000,000, to reach another new all-time peak. . . . As it spends lavishly with one hand it drives the wages of capital to new low levels with the other. . . . The real forgotten man of this regime is the saver. . . . If through years of industry and self-denial he has accumulated income-bearing investments, he is now confronted with refunding operations which sharply reduce his returns. These conversions at lower interest rates are directly or indirectly due to Government activities. Through heavy purchases of Government securities, the Federal Reserve system has artificially forced down money rates, making refunding of both public and private issues possible. Theoretically an easy money market should stimulate enterprise, and it is true that many investors, in the hope of avoiding loss of income, have transferred their funds from bonds to stocks. But if this flight from bonds merely has the effect of inflating stock prices and is unaccompanied by a broad revival of business, the investor may be due for an unpleasant shock.

Taxes on the Way Up

But whatever his income may turn out to be, he is sure to be

loaded with higher taxes. . . . The initial effort, of course, will be to obtain greater revenue by taxing the rich. . . . But this admittedly has its limitations; in the end every one will have to stand a larger share of the cost of government, that is, if the national budget is ever to be balanced.

But balancing the budget does not seem to be a matter of much concern here—at least not yet. Remote responsibility is not conducive to economical management. Like a rich man's son, the Administration never has to worry about where the next dollar is coming from . . . it is enough to write a check and count on the old man to have a balance to cover it. There is apparently no appreciation that continued excesses of outgo over income make it increasingly difficult for business to effect the recovery so essential to the production of adequate revenue.

Concern about expenditures, of course, may be outmoded . . . a relic of scarcity economy. Many things are hard to understand here, particularly for an outsider. . . . To the Washngton press representatives (including a liberal sprinkling of female intellectuals), who are accustomed to rub elbows with the great and the near great from day to day, there is a minimum of perplexity . . . on the contrary there is a degree of sophistication that is hard to match anywhere else in this broad land. . . . They have seen gigantic plans developed with bold strokes under the leadership of a man who has an air of supreme confidence that is contagious. . . . And make no mistake about it, the chief executive is in excellent health and in the best of spirits. He may have lost touch with the sentiment of the country at large but he is decidedly *not* panicky over his recent reverses at the hands of the courts.

Let the Courts Do Their Worst

Rather one gets the impression that the Administration will be pleased if the courts do their worst, turning thumbs down on the constitutionality of all Government legislation that is put to a court test. Already one hears that the Constitution was made for man, not man for the Constitution. . . . A swell campaign issue in the making! William Green has already indicated that organized labor will enthusiastically support any political drive that may be launched against the veto power of the courts. In the *American Federationist* he says:

"Wage-earners of this country are vitally concerned with establishing the power of Congress to regulate interstate commerce, including all work which directly or indirectly affects interstate commerce, because only Congress has control coextensive with the basis of organization of industry."

Of course this argument is predicated on the familiar thesis that the country, through improved transportation and communication, is getting smaller, that State lines are being economically obliterated, etc. In the New Deal atmosphere, with so many new and large undertakings centering in Washington, it is easy to visualize the country as a big puppet show in which all the strings are pulled at the capital. It matters little that in the steel industry, the power industry and other industries there are accumulating signs of greater and greater localization. And little heed is given to the reluctance of local Governmental bodies to give up their autonomy, particularly in hard times.

Federal vs. State Conceptions

Quite apart from the shrinkage in physical distances of which one hears so much is the widening gap between Washington and the rest of the country in fundamental conceptions. How remote one feels here from bucolic Kansas, where Governor Landon has put the State on a "pay-as-you-go" basis, balancing the budget, reducing bonded indebtedness and cutting taxes. Some will say that the corn-fed Jayhawkers are still living in the "horse and buggy" age; others aver that they are admirably endowed with horse sense. . . .

But one does not have to make a hypothetical jump to Kansas to get a feeling of remoteness. In neighboring Maryland former Governor Ritchie breaks with national Democratic leadership and declares that the New Deal has gone on the rocks. . . . And Senators Glass and Byrd of nearby Virginia are more and more outspoken in thir criticism of New Deal policies, the senior Senator from the Old Dominion characterizing legislation to block gold clause damage suits as "immoral."

If the Constitution is destined to be a major issue in the next Presidential election, States' rights will probably be another. The States, in the last analysis, are going to pay the bill that Uncle Sam is running up. The relationship between States and the national Government will become more and more that of creditor and debtor, especially if the latter continues to encroach on sources of revenue, such as inheritance taxes, which have heretofore been reserved to the former.

Putting the Boon Into Boondoggling

The States, in their provincial simplicity, are still primarily interested in recovery. Not so here; zeal for reform has not abated. The President purposes to put through his "tax the wealthy" program if it takes all summer. Harry L. Hopkins, works progress administrator and former social worker, declares with some show of indignation that it will be a "shame" if the Cincinnati decision banning Federal condemnation of private property will delay the slum clearance program. . . . Slum replacement projects, according to the Administration's own declaration, are not intended to be self-supporting . . . They will house the "underprivileged" who cannot afford to pay rent commensurate with the construction and maintenance costs of the projects.

Mr. Hopkins, however, promised to get all the unemployed off the direct relief rolls before Christmas. Although figures for the first week in July showed only 15,000 persons at work under the new job program outside of increases in the Civilian Conservation Corps, he predicted that the Administration would reach its objective of employing 3,500,000 idle some time after the beginning of November. Unemployables, estimated at 1,500,000, will then have to be taken care of by the individual States.

When it was suggested by press representatives that some of the works projects authorized for New York City, such as preparing a "vertical and horizontal" survey of the city and providing "recreational leadership" in city hospitals, the "leadership to extend in some cases to graduate nurses and internes," verged on boondoggling, the administrator replied that only about 30 per cent of current unployment is in the construction industry and that work must be provided for those with other kinds of skills. . . . Apparently it is better to have boondoggled for one's relief money than never to have boondoggled at all.

Concern among suppliers of materials over the Government announcement that works relief expenditures are to be limited to $1,100 per man per year has been due, to a large extent, to misapprehension. The figure $1,100 is merely an average . . . some projects will run much higher. . . . Although the Government has not said so in as many words, it is obvious that liberal expenditures for boondoggling will permit higher

expenditures per man for such construction projects as are undertaken. Besides, the $1,100 merely represents the Government's direct contribution. In the case of jobs costing $25,000 and over, the Administration will make a direct grant of 45 per cent, lending the remainder if the borrower cannot obtain the funds elsewhere. Usually the loans are in the form of bonds and, in the case of the public works program now being concluded, many bonds of this type were sold on the open market after having been originally taken by the RFC.

In the case of jobs costing less than $25,000, local governments will be asked to supplement the funds supplied by Washington. A considerable part of this work will be done under direct Government supervision without the award of contracts. Purchases of materials for such jobs may, in some instances, be pooled regionally or nationally, but regardless of the way buying is handled it will be under the supervision of Admiral C. J. Peoples, director, procurement division, Treasury Department, Washington. It is estimated that one-half a billion dollars' worth of materials will be bought under his authority within the next six months. . . . Suppliers of materials are urging that orders be placed locally so far as is practicable.

Reports in the press that the Administration is already planning relief expenditures of three billions for the fiscal year beginning July 1, 1936, were characterized as "cuckoo" by the President in a press conference last Friday. He said that no definite recommendations would be made until he sent his budget message to Congress next January and that naturally the unemployment situation at that time would be taken into account in estimating relief requirements.

President Discusses Manganese

Manganese came in for extended comments by the President in his discussions with the press last week. Manganese, for some reason, has always been a favorite topic among statesmen and near statesmen. Years ago Senator La-Follette the elder inquired in the course of a hearing, "Ferromanganese is the essence of manganese, is it not?" It is not, quite the reverse, but to get back to the present . . . the President declared that domestic deposits of manganese ore were "slim" and that to shut off manganese imports would greatly increase the cost of steel. Whether the American manganese industry employed 354, as reported by the State department, or 3000, as reported by Senator McCarron of Nevada, many times that number would be given employment in this country, he said, as a result of increased purchasing power of foreign nations supplying us with manganese.

NRA Reduces Its Payroll

In one division of the Administration the economy ax is at work and that is in the NRA. Out of a total payroll of about 5100, slightly more than 1200 employees have been given their walking papers. The reduction in outlay for salaries will amount to $2,500,000 a year. . . . But these dismissals, forced by the Schechter decision, will be soon offset, in part at least, by the building up of a new organization to administer the social security act. . . . Though the social security bill has not yet been actually enacted, because of a deadlock between the House and the Senate over the Clark amendment authorizing the retention of private pension plans, passage of the legislation is merely delayed, not permanently blocked.

One of the first things that will engage the NRA organization that is retained will be to investigate reports of violations of code wage and hour standards since the codes were stripped of legal authority. James O'Neill, NRA head, told the press that many of these reports had to do with very small companies, while others were obviously vicious fabrications. . . . Most of the time of the NRA will be devoted to factual studies, recently inaugurated, of the experience of different industries during the code period. Fears have been voiced in some quarters that the reports based on these studies will consist mainly of "boondoggerel" . . . in other words, the investigations and the preparation of the reports will provide employment for people who would otherwise have to be let out. . . . However, Dr. Leon Marshall explained to the press that where it was possible to prepare reasonably complete surveys the reports would be made public and that, in any event, they would be used as a guide for the future of the NRA or any other body that might take its place. . . . Which suggests that the present Administration has no idea of permanently abandoning the work which was temporarily interrupted by the Schecter decision.

Voluntary Code Submitted to FTC

Significant in this connection is the announcement by the Federal Trade Commission of its receipt of the first voluntary code. . . . All code matters have been transferred from NRA to FTC. . . . The voluntary code or trade practice agreement, as it is called in Trade Commission parlance, was submitted by the wholesale tobacco distributers, representing 96 per cent of the industry. The use of nationally known brands of cigarettes as "loss leaders" was lisited as an unfair trade practice in the first rule listed in the trade agreement. In group 2 rules, not enforceable by law, the industry binds itself to observe the labor conditions set forth in the NRA code under which the trade formerly operated.

Another attempt to revive the code era is seen in a new 30-hr. week bill, which has been approved by the House labor committee. This proposed measure would license industries shipping goods in interstate commerce. To obtain a Federal license an industry would be compelled to limit the working time of employees to 30 hr. a week, provide wages "adequate for a decent and comfortable living," accept collective bargaining, outlaw dealings with parties to "yellow dog" contracts, ban workers under 16 years of age, and forbid convict or forced labor. . . . The bill, like other 30-hr. measures introduced previously, is said to lack White House support.

Congress Becomes Constitution-Conscious

The Guffey coal bill, on the other hand, is slated for passage, although there is said to be considerable concern in committee about its constitutionality in spite of the Presidential injunction to pass it rgardless. . . . Other legislation is being given the once-over for constitutionality . . . for example, the AAA act is being amended in the hope of getting it by constitutional objections. . . . On July 17 the Senate reversed its vote of the previous day authorizing certain price-fixing provisions. . . . This was obviously in response to the Boston circuit court decision declaring processing taxes unconstitutional. . . . Congress is also changing its tune with reference to the President's tax program. Excess profits taxes will probably replace the graduated corporate income tax. . . . Though an excess profits impost would probably stimulate investments in capital goods, that would be a blessing so far as business is concerned, albeit it might reduce expected tax revenues.

Stimulation of Capital Goods Industry Foreseen

Such a boost for the capital goods industry, coupled with current diversion of investment funds

from bonds to stocks, might bring about artificially all of the conditions necessary for pronounced recovery. In fact, there is already some concern among local economists lest the country be plunged into a period of excessive credit inflation. Our monetary gold reserves, it is pointed out, are the largest in history, even if revaluation is ignored. This fact, coupled with the easy money policy of the Federal Reserve, provides the basis for much broader credit inflation than we experienced in the '20's. . . . There is real anxiety lest monetary control will prove inadequate as a brake on the expansion movement once it gets well under way. . . . A continued unsympathetic attitude toward business on the part of Washington may prove a boon in disguise if it serves to act as a check on business acceleration—at least so say some of the economic seers.

William Green has become Constitution-minded in evaluating the Wagner-Connery labor disputes act. In letters sent to constituent unions of the American Federation of Labor he sounded a note of caution against action that would not clearly come within the purview of the law. One of his admonitions was, "Don't file charges if the employer is engaged in a purely local business and the case in no way affects interstate commerce."

The new national labor board, which is about to be appointed, will be a quasi-judicial body which will pass on alleged violations of the labor disputes act. It will have nothing to do with the settlement of strikes. Mediation will be left to special boards, like the steel labor board, which as a mediation agency has been transferred to the Department of Labor.

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The Pettengill long-and-short-haul bill has been reported to the House floor by the House interstate commerce committee. It is designed to enable railroads to meet the competition of water carriers by charging less for long hauls than for shorter movements over the same route and in the same direction.

It is not unlikely that action on the bill will be delayed until the next session of Congress.

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Padding of Federal Payrolls Charged

The Roosevelt Administration has added 35,737 employees to Government payrolls in Washington alone and 112,888 in the States, according to a statement by the American Liberty League, charging violation of Democratic campaign pledges.

In an analysis of so-called Federal bureaucracy, the league stated that the "mushroom growth represents an unjustifiable burden on taxpayers and a menace to the liberties, rights and welfare of individual citizens and business enterprises. New jobs have been distributed as a reward for political service rather than on the basis of need or efficiency."

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Resentment Against Reciprocal Trade Agreements Growing

The Senate yesterday, by a vote along strict party lines, agreed to table an amendment to the revised Agricultural Adjustment Act offered by Senator McCarran, which would have made further reciprocal trade agreements with foreign counties subject to Senate confirmation.

The recent Cuban agreement and the proposed Brazilian-American agreement came in for sharp criticism in the debate preceding the vote. It was charged that the agreements threw thousands of American workmen out of jobs.

Administration leadership in the Senate had considerable difficulty getting the matter in hand and sharp resentment on the part of many Senators was evident when the debate on the subject was limited.

New York Shipbuilding Strike Continues

THE attempt on the part of the New York Shipbuilding Co. to end the 10 weeks' strike at its Camden, N. J., plant is being watched closely by the Department of Labor. In a press conference this morning, Secretary Perkins admitted that she has been in close touch with the Navy Department in her attempts at conciliation, but declined to comment on the attitude taken by the Navy. The company has Naval contracts totaling more than $35,000,000. When the company attempted to reopen the plant this morning after rejecting the arbitration plan offered by the Department of Labor, only about 500 men, including more than 100 foremen and assistant foremen reported for work, while more than 3000 were on the picket line. Union estimates of men reporting for work were much lower. The outcome of the strike has taken on added significance in view of the large Government contracts held by the company and also because the Navy Department will open bids August 7 on 14 additional ships. The Camden company would logically bid on this program. If the Walsh bill now in Senate Committee is passed before the letting of the new Navy contracts, the Government would be given the right to dictate wage rates and hours on Federal contracts. Since the collapse of the NRA, no such power is granted and the attitude taken by the Navy Department is naturally being watched with interest. The New York Company has never refused to bargain collectively with its employees, but has simply been unwilling to accede to their demands. Secretary Perkins characterized as untrue published reports from Camden, saying that the Department of Labor has only been interested in the strike for the last five days. She said that conciliators from the Department have been active since two days before the strike was called on May 13.

Granted Relief From Short Haul Rates

WASHINGTON, July 23.—Railroads in Central Freight Association and Trunk Line territories have been authorized by the Interstate Commerce Commission to establish and maintain over all routes for the interstate transportation of iron and steel articles in carloads, except cast iron pipe and fittings, the lowest rate applicable over any line or route from and to the same points, constructed on a distance scale.

It was further ordered that in observing the revenue limitations set forth, where rates are on a group basis, average distances from and to points in such groups or distances from and to base points may be used in lieu of actual distances from and to individual points.

Following the prescription of the short-haul scale by the Pennsylvania Commerce Commission, railroads, in the interests of uniformity and in order to meet alleged truck competition, established the same scale on interstate traffic within the considered territories. No evidence was offered with respect to truck competition. At 96 miles, the short haul scale merges with the standard scale.

The President, on July 22, approved a grant of $412,363 from the PWA to New York City for the construction of a five-story steel frame fire-proof hospital building. At the same time a grant of $215,141 was approved for the construction of a power plant building at Neponsit Beach Hospital in New York.

Construction Demands Maintain British Steel

LONDON, ENGLAND, July 23 (*By Cable*).—Demand for pig iron is active, with two hematite furnaces being relit and the prospect of others following suit.

Steel producing activity is being maintained and the prospect is for less seasonal decline than is customary. The motor industry has let up somewhat, but engineering, construction and public works have become more active.

Consumers of semi-finished steel are well covered and new business in this line is quiet but makers are heavily booked with orders. Numerous shipbuilding orders have been placed, including a £400,000 order for Russia. Seven cargo vessels are involved in this and the tonnage of plates amounts to 2500. There is also improved overseas demand for railway material.

In tin plate, the home demand is quieter, however, with good inquiries. Export tin plate business is being well maintained especially with the Argentine, South Africa and the Continent.

The announcement of the proposed Richard Thomas new strip mill at Redbourn has aroused resentment in South Wales and a statement from the Government is likely to be made soon.

Continental iron and steel demand is dull and idle shifts are increasing. Limited sales to the United Kingdom have been resumed, owing to the impossibility of settling all details of the Anglo-Continental agreement by Aug. 7. The provisional agreement has been extended to Dec. 7.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9	
Billets, open-hearth	£5 10s.	to £5 15s.
Tin plate, per base box	*18s. 2d.	to 18s. 7½d.*
Steel bars, open-hearth	£7 17½s.	
Beams, open-hearth	£7 7½s.	
Channels, open-hearth	£7 12½s.	
Angles, open-hearth	£7 7½s.	
Black sheets, No. 24 gage	£9 5s.	
Galvanized sheets, No. 24 gage	£11 5s.	

*To Nov. 1: 18s. 5d. to 18s. 10½d. thereafter.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.	
Wire rods, No. 5 B.W.G.	£4 10s.	
Steel bars, merchant	£3 5s.	
Sheet bars	£2 8s.	
Plate, ¼ in. and up	£4 2s.	6d.
Plate, 3/16 in. and 5 mm.	£4 4s.	8d.
Sheets, ¼ in.	£4 9s.	8d.
Beams, Thomas	£3 2s.	6d.
Angles (Basic)	£3 2s.	6d.
Hoops and strip base	£4 2s.	6d.
Wire, plain, No. 8	£5 7s.	6d.
Wire nails	£5 15s.	
Wire, barbed, 4 pt. No. 10 B.W.G.	£8 15s.	

Reinforcing Steel

Awards 800 Tons—New Projects 76,610 Tons

AWARDS

Queens, N. Y., 550 tons, highway in Interborough parkway, to Concrete Steel Co.

Newark, N. J., 100 tons, United States Industrial Alcohol Co. building, to Concrete Steel Co.

Erie County, N. Y., 150 tons, mesh for South Parkway highway, to Wickwire-Spencer Steel Co.

NEW REINFORCING BAR PROJECTS

Atlantic County, N. J., 110 tons, road extension and crossing elimination; bids Aug. 5 at Trenton.

Dartmouth, Mass., 120 tons, State bridge.

Columbus, 250 tons, for Ohio FERA, for delivery to Cuyahoga Falls; Tarrier Steel Co., Columbus, low bidder.

Cleveland, 340 tons, three buildings in connection with Easterly sewage disposal plant; bids Aug. 2.

Cleveland, 275 tons, administration building for Easterly sewage disposal plant; Hunkin-Conkey Construction Co. general contractor.

State of Michigan, 2000 tons, wire mesh for highways.

Clinton, Iowa, 600 tons, lock No. 13 in Mississippi River; Central Engineering Co., Des Moines, low bidder on general contract.

Los Angeles, 72,470 tons, with delivery prior to July 1, 1936, or 104,640 tons with delivery prior to Jan. 1, 1939, for Colorado River aqueduct, Specification 109; bids Aug. 19.

Montrose, Colo., 166 tons, canal work on Uncompahgre project, Bureau of Reclamation will furnish material; bids Aug. 8.

Sausalito, Cal., 100 tons, yacht harbor; bids July 29.

State of California, 242 tons, highway work in eight counties.

Los Angeles, 525 tons, conduit on Verdugo Wash from Kenilworth Avenue to Los Angeles River; county will buy the steel; general contract awarded.

Pipe Lines

Oklahoma Natural Gas Co., Oklahoma City, Okla., plans new welded steel pipe line from natural gas fields at Edmond, Okla., to Oklahoma City, for supply at latter place. Cost about $75,000; also new 12-in. steel pipe line in southern part of city for trunk line supply in that district, and other steel supply lines in different parts of municipality. Improvements and replacements will be made in steel pipe line to Chickasha, Okla., gas fields. Extensions are planned in distribution lines in Oklahoma City, where company has 25-year gas franchise. Entire project will cost over $200,000 and is scheduled to begin late in August.

Crystal Natural Gas Co., Crystal, Mich., care of Earl J. Frost, Crystal, director, recently organized, plans new welded steel pipe line from Montcalm County gas fields to Crystal for service in Crystal Lake district. Steel pipe lines for distribution will be installed. A 25-year franchise is being secured for furnishing natural gas for heating and industrial purposes.

West Utility Co. of Missouri, Smithville, Mo., has secured permission to acquire gas distributing systems of General Utilities Co. at Smithville, Avondale, Liberty and Plattsburg, Mo., and plans steel pipe line extensions and improvements.

Chicago will buy 20,000 ft. of 2½-in. standard steel pipe.

San Francisco will take bids Aug. 8 on 200 tons of 10- and [illegible]-in. steel pipe for National Park service.

Applications for Work Relief Money Pour in

APPLICATIONS for work relief money, under the emergency relief appropriation act, aggregated $2,884,194,079, representing 3051 projects, as of July 17. Of this total, 437 applications had been withdrawn, leaving 2614, calling for an expenditure of $2,165,739,022. On the same date 641 applications, involving expenditures of $818,137,976, had been approved.

In addition, allotments under the act for which no applications were filed, allotments for direct relief and allotments prior to the formation of the Division of Applications and Information, total $2,078,366,242.

This latter total is subdivided as follows:

Direct and Statutory Allotments	
Public roads	$ 400,000,000
Statutory roads	100,000,000
Works Progress Admin.	
State programs	116,578,272
Resettlement administration	98,000,000
Total	$ 714,578,272
Allotments for Direct Relief	545,000,000
Allotments Prior to Formation of Division of Applications and Information	
*CCC	400,000
Resettlement administration	250,000
Total	$ 650,000
Grand Total	2,078,366,242

*A previously approved allotment for CCC under independent offices totaled $322,239,000.

OBITUARY

JAMES L. SINYARD, prominent Milwaukee industrialist for 35 years, and since 1923 vice-president of the Badger Meter Mfg. Co., Milwaukee, died July 15, aged 71 years. He was born at Summit Hill, Pa., and following his graduation from Lehigh University went to Milwaukee in 1900. Shortly afterward he became associated with the A. O. Smith Corpn., which he served as secretary and sales manager during the development of its extensive pressed steel automobile frame business. Mr. Sinyard was president of the National Association of Bomb Manufacturers during the World War.

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FRANK HAMACHECK, SR., president of the Hamacheck Machine Co., Kewaunee, Wis., and nationally known inventor and manufacturer, died on July 18, aged 82 years. He was born in Austria, coming to America in 1867. Ten years later he bought a small foundry at Kewaunee which he developed into a large plant manufacturing devices of his design for agricultural purposes. Mr. Hamacheck originated the ingenuous pea harvesting and vining machine his concern builds on an international scale. His contributions to agricultural-mechanical progress were recognized by special honors granted by the University of Wisconsin a number of years ago. His son, Frank, Jr., is general manager of the company.

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EDWARD W. GOODRICH, Appleton, Wis., noted inventor and designer of automatic machinery for paper and rug mills and woodworking lathes, died July 12, aged 70 years. He was born in Blazer Falls, N. Y., and in 1885 moved to Appleton, assisting in the design and construction of the first hydro-electric generating plant in the world in that city. Twenty years ago he moved to Buffalo, N. Y., continuing his inventive career until returning to Appleton in 1930.

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EDWARD S. ILLIG, sales manager for the Bethlehem Steel Corpn., Buffalo district, died July 18 at Atlantic City, where he had gone to recuperate from a long illness, aged 56 years. Mr. Illig, who was born in Reading, Pa., came to Buffalo from Pittsburgh when the old Lackawanna interests were taken over by Bethlehem.

JOHN R. MORGAN, formerly chief engineer of Morgan Engineering Co., Alliance, Ohio, died July 11, aged 79 years.

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F. X. L. MCNAMARA, vice-president of the O'Neill-McNamara Hardware Co., Vicksburg, Miss., died July 8.

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WALLACE WILLIAM NEAR, president and manager of Page-Hersey Tubes, Ltd., Toronto, Ont., died in that city on July 12, aged 70 years. He was born in eastern Ontario and engaged in the manufacture of Page-Hersey Tubes at Guelph and Welland in 1904. Mr. Near was also president of the Cohoes Rolling Mill Co., Cohoes, N. Y.

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ROYAL C. REMICK, an official of the Youngstown Steel Co., Youngstown, was killed in an automobile accident near Baltimore on July 14. He was 56 years old.

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J. F. NEWMAN, president of the Lawrenceville Bronze Co., Pittsburgh, died suddenly on July 14, aged 55 years.

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J. J. SEITZ, for four years president of the Mitchell Specialty Co., Philadelphia, died on July 7 at his home at Beach Haven, N. J. He was 46 years old.

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HARRY GILLETTE, vice-president, Detroit Steel Products Co., Detroit, died July 6, after an operation. Mr. Gillette developed the Holorib type of steel section for use in building construction. Before becoming associated with the Detroit company he was for a long time identified with business activities in Cleveland and served for some time as district manager in that city for the Johns Manville Corpn.

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WILLIAM H. POWELL, electrical engineer, and for 27 years identified with the Allis-Chalmers Mfg. Co., Milwaukee, died July 8, aged 68 years. He was born in London, Eng., and came to America at the age of 3. Following his graduation from Cornell University in 1890, Mr. Powell joined the Bullock Mfg. Co., Cincinnati, becoming general manager. With the acquisition of the Bullock company by Allis-Chalmers Mfg. Co. in 1908, Mr. Powell entered the main works at Milwaukee. He was a Fellow of the American Institute of Electrical Engineers and a member of Sigma Pi, national honorary engineering society.

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CHARLES B. YOUNG, former chief mechanical engineer for the Burlington Railroad, died July 1 at his home in Riverside, Ill. Mr. Young received his early education in East Aurora, Ill., and was graduated from the University of Illinois in 1891.

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JOHN O. KLINGELHOFER, director of the Pittsburgh Bridge & Iron Works, Pittsburgh, died at his home in that city on July 5. He was 62 years old.

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JOHN BATH, president of John Bath & Co., Worcester, Mass., died at his home of a cerebral hemorrhage on July 9, aged 72 years. For 25 years he had been prominently identified with the development and manufacture of small tools and gages.

Steel Income Lags Behind Production

INCOME from the sale of products of the iron and steel industry has failed to increase at the same rate since 1932 as has production, according to the American Iron and Steel Institute. In 1932 the industry produced for sale in the United States approximately 12,674,000 gross tons of pig iron and various steel and iron products, receiving from their sale approximately $670,000,000. During the following year the iron and steel industry produced for sale in this country 21,451,000 gross tons—an increase of 69 per cent over 1932 production.

Receipts from such sales, however, failed to increase in the same proportion, and rose only 49 per cent above the 1932 level to a total of $997,000,000.

The steel industry's production for sale in 1934 reached 23,575,000 gross tons—86 per cent above the total for 1932. The increase in value of sales in 1934 to a total for the industry of $1,162,417,000, however, was only 73 per cent above the 1932 figure, compared with 86 per cent increase in production for sale since the depression low year.

PERSONALS

DR. JOHN A. SCHAEFFER will resign as vice-president and director of research of the Eagle-Picher Lead Co., to become president of Franklin and Marshall College, Franklin, Pa. Dr. Schaeffer, whose headquarters are at the company's properties in Joplin, Mo., will assume his new duties about Aug. 15. At the time of Dr. Schaeffer's birth in Kutztown, Pa., in 1886, his father was an instructor at Franklin and Marshall. Dr. Schaeffer received his Bachelor of Arts degree at that college in 1904. He was given his Ph.D. degree at the University of Pennsylvania in 1908. He was an instructor in chemistry at Carnegie Institute of Technology for three years, leaving there to become chief chemist for Eagle-Picher in 1911. In 1921, Dr. Schaeffer was made vice-president in charge of manufacturing, becoming vice-president in charge of research in 1931.

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GEORGE J. KELLER, formerly western New York representative of the Jones & Lamson Machine Tool Co., is now associated with R. L. Crane Machinery Co., Buffalo, as sales engineer.

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JAMES T. SUTLIFF, for many years located at the Connersville, Ind., factory, is now associated with the Chicago office of the Roots-Connersville Blower Corpn., 20 North Wacker Drive. Mr. Sutliff has had experience in the pump field, and will specialize in the sale of type T turbine pumps and Victor-Acme blowers.

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JOHN W. BLACKFORD, for many years associated with the Torrington Co., Torrington, Conn., as Detroit district manager, and also formerly associated with Consolidated Machine Tool Corpn., Rochester, N. Y., has joined the organization of J. N. Moyer, 465 North Fifth Street, Philadelphia.

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COL. L. JOLY, engineer in automatic control, is now associated with Fred S. Bloom, 916 Behan Street, N. S., Pittsburgh, in the sale of Askania automatic control in the Pittsburgh territory, for H. A. Brassert & Co., Chicago.

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J. R. STONE, for several years identified with the machine tool business in Detroit, and recently in California, has joined the G. C. Howarth Machinery Co., Detroit.

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GEORGE G. PRAGST has severed his connections with the Franklin Machine Co., Providence, R. I., after 13 years' service as sales engineer in southern New England, and is opening an office at 260 Esten Avenue, Pawtucket, R. I., as manufacturers' agent for machinery, small tools and hardware.

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SIR ROBERT HADFIELD, Bart., F.R.S., has been awarded the Albert Medal for 1935 by the Royal Society of Arts, London, England, for his researches in metallurgy and his services to the steel industry.

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WALTER S. STEPLER has been appointed representative of the North American Refractories Co., Cleveland, in the Southern territory south of Tennessee, with offices at 835 Martin Building, Birmingham.

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EDWIN E. HALL has become associated with H. M. Pforsich Co., Inc., Western representatives of Ames-Baldwin-Wyoming Co., New York Wire Cloth Co. and Cincinnati Tool Co. Mr. Hall is well known to the trade, having been with the Pacific Coast Steel Corpn. for the last eight years and prior to that with the Union Hardware & Metal Co. of Los Angeles. In his new connection he will be in charge of the Los Angeles office.

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E. J. BUFFINGTON, formerly president of the Illinois Steel Co., Chicago, has given an endowment to Vanderbilt University, Nashville, Tenn. This endowment will be known as the Drucilla Moore Buffington chair in memory of the late Mrs. Buffington.

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C. D. CLAWSON, export manager Ferro Enamel Corpn., Cleveland, has been named managing director of the company in South America. The corporation is opening two foreign subsidiaries, one at Sao Paulo, Brazil, and the other at Melbourne, Australia.

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FRED E. WILHEM has become associated with Maydwell & Hartzell, Inc., Pacific Coast sales representative for Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. He has been connected with steel companies on the Coast for the last 16 years.

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DAVID J. JOSEPH, president of David J. Joseph Co., dealer in scrap, Cincinnati, sailed on July 10 for Europe. Mr. Joseph contemplates opening European markets for exportation of old materials.

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E. A. LORD, who was formerly in the Chicago office of Concrete Steel Co., has returned to that company's Chicago office as assistant sales manager.

New Production Officials of Chance-Vought Corpn., Hartford, Conn., whose appointments were announced in THE IRON AGE, July 4.

J. W. MacMORRIS, general superintendent

J. M. BARR, factory manager

R. WITBECK, chief inspector

▲▲▲ Capital Goods Index

LAST week's estimate of 54.5 for THE IRON AGE index marks still another advance in durable goods activity as measured by the index, and thus far activity in July has followed the course it took in June, though on a level roughly 3 to 4 per cent lower. A glance at the chart below will show this similarity. The figure for last week indicates a gain of 1.6 points over the revised index number for the preceding week, but is approximately 3 per cent beneath the figure of 56.2 for the same week in June.

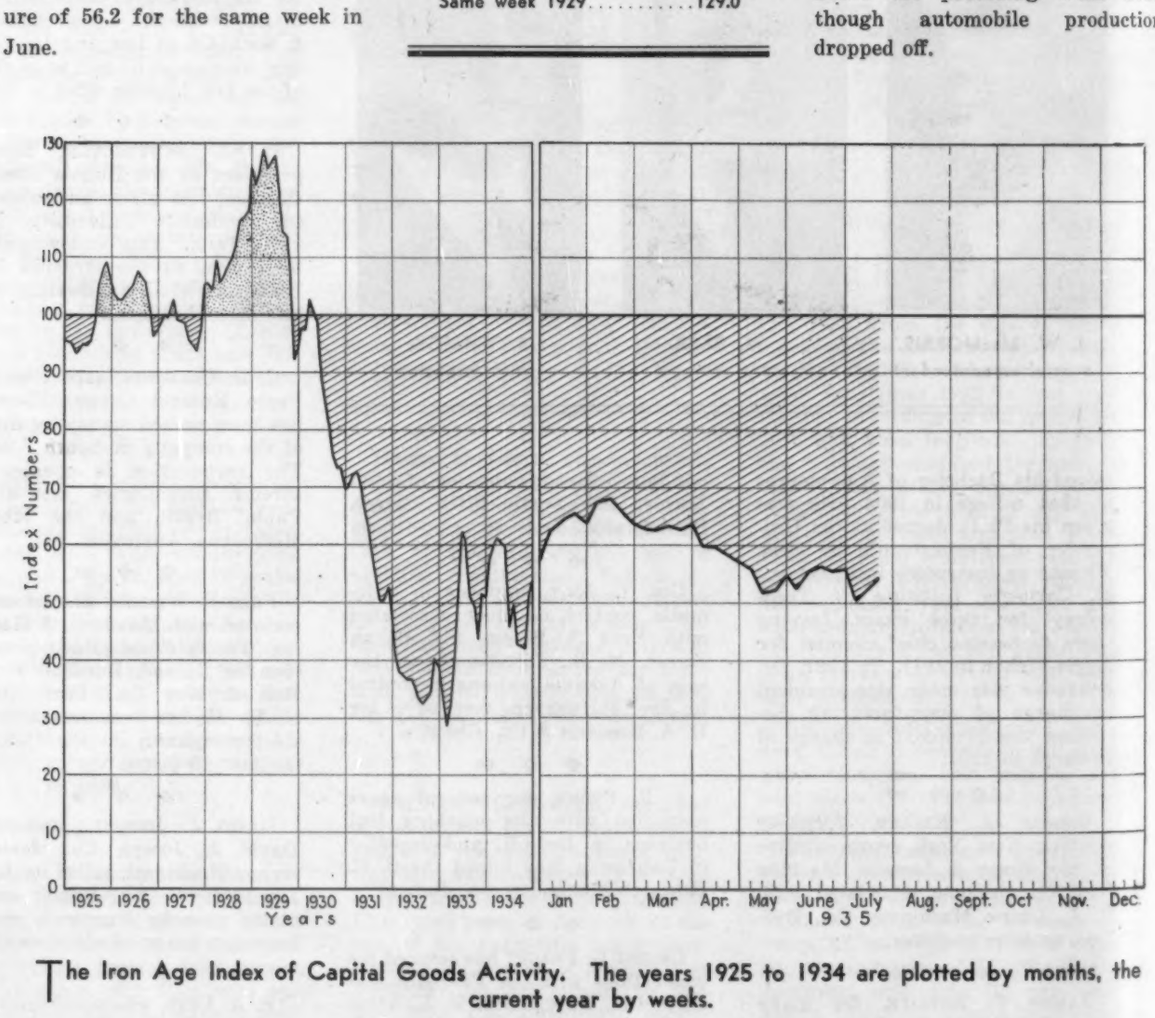
The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week (est.)	54.5
Preceding week (rev.)	52.9
Same week last month	56.2
Same week 1934	48.6
Same week 1933	64.0
Same week 1932	35.2
Same week 1931	63.7
Same week 1930	86.9
Same week 1929	129.0

Although for the corresponding period in 1929 activity was about 137 per cent greater than at the present level, last week's figure was ahead of the same week in 1932 by 55 per cent, and ahead of 1934 by 12 per cent. At the same time it was 15 per cent beneath the index number for the like week of 1933.

The encouraging feature of this rise in the index was the unexpected gain registered by steel, which last week rose 4½ points above the preceding week even though automobile production dropped off.



The Iron Age Index of Capital Goods Activity. The years 1925 to 1934 are plotted by months, the current year by weeks.

Continues Upward ▲▲▲

Reference to THE IRON AGE cumulative index shows that, on the basis of the average rate prevailing from 1925 to 1927, 1935 is the equivalent of half a week's production ahead of 1934, approximately 5½ weeks ahead of 1933 and 1932, though about 19½ weeks under 1929.

Automobiles and Machine Tools Show Improvement

The automobile and machine tool industries constitute two of the brightest spots on the industrial horizon at the present time. The products of both industries are durable or capital goods, automobile sales reflecting consumer demand, while orders for machine tools are an indicator of the industrial demand for machinery and equipment. The automobile industry itself is one of the best customers of the machine tool industry, using many special-purpose tools which have to be replaced at frequent intervals, particularly when radical changes in design are made. This close relationship furnishes a partial explanation of the similarity in the trends, except for different seasonal movements, of automobile production (cross section area) and new orders for machine tools as shown in the chart at the bottom of the page.

Both industries expanded to record high levels during 1929. Machine tool orders reached a peak 96.4 above the base period in February, while approximately 622,000 automobiles were produced in April of that year. The subsequent decline carried automobile production to the low point of the depression in 1932, when hardly more than one-fourth as many cars were produced as in 1929. Machine tool orders fell off much more drastically, and in 1932 the average monthly volume of domestic new orders was only one-eighth as large as in 1929.

The last two years have witnessed a sharp recovery in both industries from the low levels of 1932. After further declines in the first quarter of 1933 machine tool orders gained rapidly in the latter part of that year until December when the volume of new orders equaled 60 per cent of the 1926 average monthly shipments. Following a recession during the first half of 1934 a further recovery has ensued during the past year, with new orders in May at the highest level since 1930.

Automobile production showed a substantial gain in 1933 and further improvement in 1934. The number of cars produced during the first half of 1935 was larger than in the corresponding period of any year since 1929, and actually exceeded the first half of 1930 by more than 57,000 cars.

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AUTOMOBILE PRODUCTION AND NEW ORDERS FOR MACHINE TOOLS

Source: Machine tools new orders: National Machine Tool Builders Association; automobile production: National Automobile Chamber of Commerce; both series of data obtained from *Survey of Current Business*.

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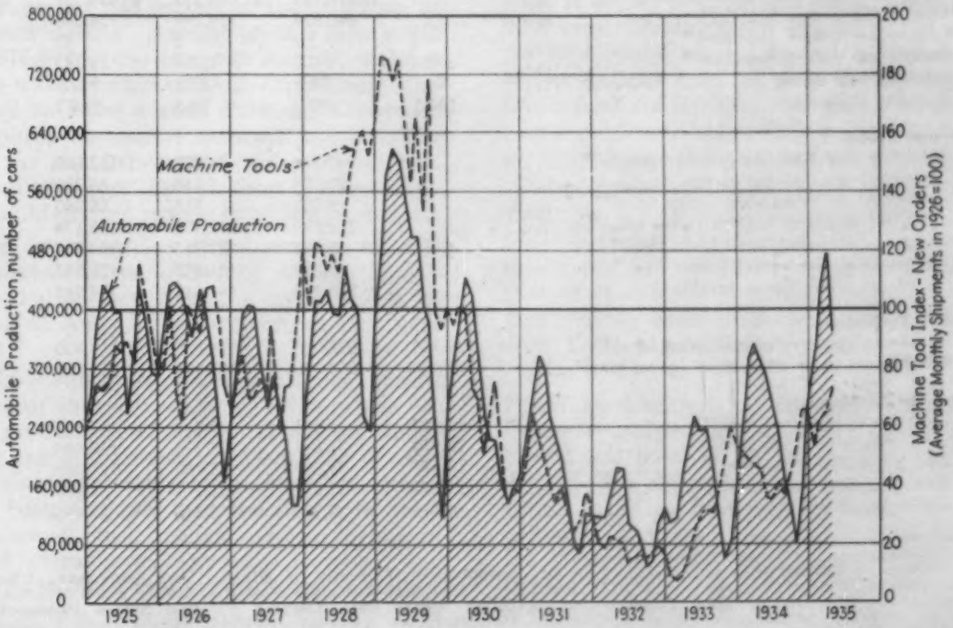


Current Metal Working Activity Statistically Shown

These Data Are Assembled By THE IRON AGE from Recognized Sources And Are Changed Regularly As More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	June, 1935	May, 1935	June, 1934	First Half, 1934	First Half 1935
Raw Materials:					
Lake ore consumption (gross tons)[a]	2,198,757	2,466,585	2,721,449	13,723,119	14,341,513
Coke production (net tons)[b]	.....	2,850,236	3,049,700	17,589,203	.....
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	1,552,514	1,727,095	1,930,133	9,798,313	9,799,000
Pig iron output—daily (gross tons)[c]	54,138	55,713	64,388	54,134	54,138
Castings:					
Malleable castings—production (net tons)[d]	.....	34,729	28,340	214,041	.....
Malleable castings—orders (net tons)[d]	.....	31,136	24,449	207,647	.....
Steel castings—production (net tons)[d]	.....	30,646	50,286	249,484	.....
Steel castings—orders (net tons)[d]	.....	29,083	41,537	273,550	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	2,230,893	2,635,857	3,059,483	16,402,554	16,024,691
Steel ingot production—daily (gross tons)[e]	89,236	97,624	117,672	105,145	103,385
Steel ingot production—per cent of capacity[e]	40.31	44.10	53.44	47.75	46.70
Employment in Steel Industry:					
Total employees[e]	.....	420,470	455,966	429,834	.....
Total payrolls (thousands of dollars)[e]	.....	46,494	49,467	258,401	.....
Average hours worked per week[e]	.....	33.9	36.2	34.1	.....
Finished Steel:					
Trackwork shipments (net tons)[e]	4,210	4,228	6,184	28,647	21,575
Sheet steel sales (net tons)[f]	128,957	149,725	114,855	1,185,644	1,144,985
Sheet steel production (net tons)[f]	143,309	191,507	199,438	1,249,231	1,225,891
Fabricated shape orders (net tons)[g]	.....	55,600	122,603	595,188	.....
Fabricated shape shipments (net tons)[g]	.....	79,336	104,041	462,071	.....
Fabricated plate orders (net tons)[d]	.....	17,630	27,395	138,833	.....
Reinforcing bar awards (net tons)[e]	14,985	12,080	21,315	110,885	112,755
U. S. Steel Corpn. shipments (tons)[h]	578,108	598,915	985,337	3,678,895	3,553,999
Ohio River steel shipments (net tons)[i]	80,620	78,106	83,718	336,432	408,648
Fabricated Products:					
Automobile production, U. S. and Canada[k]	*352,207	385,486	321,970	1,796,423	2,348,606
Construction contracts, 37 Eastern States[l]	$148,005,200	$126,718,600	$127,055,400	$854,101,900	$696,685,300
Steel barrel shipments (number)[d]	.....	554,102	696,349	3,826,114	.....
Steel furniture shipments (dollars)[d]	.....	$1,214,163	$1,045,539	$5,836,711	.....
Steel boiler orders (sq. ft.)[d]	.....	640,824	359,749	1,916,040	.....
Locomotive orders (number)[m]	3	2	3	83	16
Freight car orders (number)[m]	5,151	2	1,217	23,383	6,583
Machine tool index[n]	91.1	73.3	35.3	†42.6	†76.7
Foundry equipment index[o]	100.1	100.7	70.4	†68.3	†94.6
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	47,719	24,858	167,638	.....
Imports of pig iron (gross tons)[p]	.....	23,174	5,168	65,386	.....
Imports of all rolled steel (gross tons)[p]	.....	18,905	11,818	55,980	.....
Total iron and steel exports (gross tons)[p]	.....	286,599	219,406	1,253,174	.....
Exports of all rolled steel (gross tons)[p]	.....	65,255	71,965	494,767	.....
Exports of finished steel (gross tons)[p]	.....	60,487	61,425	429,547	.....
Exports of scrap (gross tons)[p]	.....	209,425	143,115	738,848	.....
British Production:					
British pig iron production (gross tons)[r]	529,300	558,900	514,900	2,898,400	3,172,000
British steel ingot production (gross tons)[r]	770,000	853,300	757,500	4,507,300	4,801,200
Non-Ferrous Metals:					
Lead production (net tons)[s]	33,002	37,358	33,218	213,697	192,116
Lead shipments (net tons)[s]	26,978	32,341	28,276	178,444	195,419
Zinc production (net tons)[t]	34,677	34,597	25,160	184,008	209,987
Zinc shipments (net tons)[t]	29,393	35,652	30,217	189,896	215,083
Deliveries of tin (gross tons)[v]	4,615	3,950	3,845	22,445	28,390

*Preliminary. †Three Months' Average.

Sources of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corpn.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; [l] F. W. Dodge Corpn.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

SUMMARY OF THIS WEEK'S BUSINESS

Steel Production Increases Three Points To 43½ Per Cent of Capacity

Renewal of Automobile Buying, Together with Advances in Demand on a Broad Front, Brings Output Back to Mid-May Level

RISING three points above last week's rate to 43½ per cent of capacity, steel ingot production has recovered all of the ground lost since the middle of May. The increase is the third consecutive advance since Independence Day week and promises to be followed by further gains.

A revival of buying by automobile makers, heavier orders from the railroads, larger takings of tin plate, sustained farmer buying of implements and tractors, increased specifications from jobbing interests and a rising demand from miscellaneous sources are among the factors which are giving the iron and steel market a degree of buoyancy that is remindful of pre-depression times. Though purchasing is still predominantly at close range, there is increasing interest in forward requirements, with some buyers placing orders that would be ordinarily deferred until late summer or early fall.

THE unexpected staying power of retail demand for automobiles has not only deferred the completion of old model runs but has expedited the purchase of materials for new models. Assemblies this month will total close to 275,000 units, and even August, which a few weeks ago was expected to be an exceedingly slim month, is likely to make a good showing. Chevrolet, still trying to keep abreast of demand, is scheduling 100,000 units for next month and will probably continue to produce 1935 cars through most of September. Chrysler will build current models until late in August.

The period of transition from present to new models is expected to be unusually short. Ford's Rouge plant will shut down from the night of July 26 to the morning of Aug. 12, when work on 1936 cars will be begun.

Several automobile manufacturers have placed round tonnages of sheets for August delivery for use in new model production. Ford has closed for 35,000 tons of sheets and still has some 75,000 tons of steel to purchase. No departures from current base prices have thus far been disclosed in connection with automotive purchases of steel, though certain deviations from standard extras are reported. However, the matter of extras on flat-rolled products was a subject of controversy among various mills even in the code period.

On the whole, mill adherence to existing prices is extraordinarily rigid. Among distributers price irregularities are more frequent. A concession of $1.50 a ton from the ruling price on new billet reinforcing bars was quoted by a distributer on an inquiry for the Ohio FERA. There were two other bids below the established price, the smallest concession being only 10c. a ton.

SCRAP continues to show growing strength. Heavy melting grade has risen 25c. a ton at Detroit and at Cleveland, and dealers in all districts are holding their accumulations in anticipation of heavier demand and still higher prices in the fall.

Shipments and sales of pig iron have gained sharply. Deliveries by a leading Lake furnace interest are running 50 per cent ahead of last month.

Tin plate output has been lifted from 85 to 88 per cent of capacity, but it is considered questionable whether this rate can hold beyond the end of July, when a seasonal drop is considered inevitable.

Structural steel awards of 11,100 tons compare with 17,000 in the previous week. New projects total 9200 tons. Probably the largest public works inquiry for reinforcing bars in history will come up for bids at Los Angeles Aug. 19, when the Metropolitan Water District of California will receive tenders on 72,470 tons for delivery before July 1, 1936, and on alternates of 104,640 tons for shipment prior to Jan. 1, 1939.

The Missouri Pacific has bought 10,000 tons of rails and the Nickel Plate has closed for 4000 tons. Close to 25,000 tons of heavy rolled products has been placed for the Chesapeake & Ohio freight cars, and part of the 10,000 tons required for the 500 subway cars recently ordered by the Board of Transportation, New York, has been purchased.

RAW steel output has increased in most producing centers, rising five points to 40 per cent at Pittsburgh, one point to 28 per cent in the Philadelphia district, five points to 46 per cent in the Valleys, two points to 37 per cent at Cleveland, five points to 38 per cent at Buffalo and 10 points to 75 per cent in the Wheeling area. Operations are unchanged at 49 per cent at Chicago, 95 per cent at Detroit and 30 per cent in the South.

THE IRON AGE composite prices are unaltered, finished steel at 2.124c. a lb., pig iron at $17.84 a gross ton and steel scrap at $10.83 a gross ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	July 23, 1935	July 16, 1935	June 25, 1935	July 24, 1934
No. 2 fdy., Philadelphia	$20.3132	$20.3132	$20.3132	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti	19.2007	19.2007	19.2007	19.13
No. 2, Birmingham†	14.50	14.50	14.50	14.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	18.50
Basic, del'd eastern Pa.	19.8132	19.8132	19.8132	19.76
Basic, Valley furnace	18.00	18.00	18.00	18.00
Malleable, Chicago*	18.50	18.50	18.50	18.50
Malleable, Valley	18.50	18.50	18.50	18.50
L. S. charcoal, Chicago	24.2528	24.2528	25.2528	24.04
Ferromanganese, seab'd, carlots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	27.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	28.00
Slabs, Pittsburgh	27.00	27.00	27.00	27.00
Forging billets, Pittsburgh	32.00	32.00	32.00	32.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.80
Bars, Chicago	1.85	1.85	1.85	1.85
Bars, Cleveland	1.85	1.85	1.85	1.85
Bars, New York	2.15	2.15	2.15	2.13
Plates, Pittsburgh	1.80	1.80	1.80	1.80
Plates, Chicago	1.85	1.85	1.85	1.85
Plates, New York	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago	1.85	1.85	1.85	1.85
Structural shapes, New York	2.06¼	2.06¼	2.06¼	2.05¼
Cold-finished bars, Pittsburgh	1.95	1.95	1.95	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

Finished Steel

Per Lb.:	July 23, 1935 Cents	July 16, 1935 Cents	June 25, 1935 Cents	July 24, 1934 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.55
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.65
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., Pittsburgh	3.00	3.00	3.00	3.00
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	3.05
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$11.75	$11.75	$11.75	$11.75
Heavy melting steel, Phila	10.50	10.50	10.50	10.00
Heavy melting steel, Ch'go	10.25	10.25	9.87½	9.50
Carwheels, Chicago	10.75	10.75	10.50	9.50
Carwheels, Philadelphia	11.25	11.25	11.25	12.50
No. 1 cast, Pittsburgh	13.25	13.25	13.25	12.25
No. 1 cast, Philadelphia	11.25	11.25	11.25	11.75
No. 1 cast, Ch'go (net ton)	9.25	9.25	9.00	8.50
No. 1 RR. wrot., Phila	10.25	10.25	10.25	11.25
No. 1 RR. wrot., Ch'go (net)	8.25	8.25	7.75	7.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.50	$3.85
Foundry coke, prompt	4.00	4.00	4.00	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	7.75	7.75	8.75	8.75
Lake copper, New York	8.12½	8.12½	9.12½	9.12½
Tin (Straits), New York	52.45	52.37½	51.25	52.15
Zinc, East St. Louis	4.30	4.30	4.30	4.30
Zinc, New York	4.67½	4.67½	4.67½	4.65
Lead, St. Louis	4.00	4.00	3.85	3.70
Lead, New York	4.15	4.15	4.00	3.85
Antimony (Asiatic), N. Y.	12.75	12.75	12.75	8.12½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
July 23, 1935	2.124c. a Lb.	$17.84 a Gross Ton	$10.83 a Gross Ton
One week ago	2.124c.	17.84	10.83
One month ago	2.124c.	17.84	10.71
One year ago	2.124c.	17.90	10.42

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1935	2.124c., Jan. 3	2.124c., Jan. 8	$17.90, Jan. 8	$17.83, May 14	$12.33, Jan. 8	$10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Production Advances Sharply In Tri-State Area

Rises Five Points to 40 Per Cent at Pittsburgh, 10 Points to 75 Per Cent in Wheeling District, Five Points to 46 Per Cent in Valleys

PITTSBURGH, July 23.—Steel activity in the Tri-State district has broadened on a wide front. Raw steel output in the Pittsburgh area has forged ahead five points this week to 40 per cent, 10 points to 75 per cent in the Wheeling district, and five points to 46 per cent in the Valleys and nearby northern Ohio mills. While the present pace of steel activity at Pittsburgh is exceeding seasonal expectations, further gains during the summer are considered probable, owing to an increasing demand for heavy hot-rolled products for which the district is heavily equipped. A substantial chunk of plate and shape business is in the making for the Chesapeake & Ohio freight cars, and considerable dam construction in this and other districts promises additional support for hot-rolled mill schedules.

In the current week the boost in operations at Pittsburgh partly was effected by a heavy call for sheet bars for tin plate conversion. Tin plate output this week is three points higher at 88 per cent, but it is considered dubious that this rate will hold beyond the turn of the month. Miscellaneous orders continue to play an important part in this market, while automobile tonnage, except in the case of sheets, has been deflated. Sheet mill schedules for the industry are holding at 50 per cent with the possibility of a higher rate by the week-end. Strip steel production is holding at around 35 per cent. Wire production in the Pittsburgh district is five points higher at 35 to 40 per cent.

The inquiry of a leading automobile producer for more than 100,000 tons of flat-rolled steel thus far has not resulted in any orders in the Pittsburgh district. Scrap prices, although apparently poised for a general advance, lack the impetus of important consumer demand.

Pig Iron

Expanding foundry melt in this district has stimulated an encouraging flow of small shipments. Only in unusual instances are orders entered for more than one carload at a time. Barge movement is relatively restricted. Steel-making grades are only infrequently reaching the open market, and there is little or no major buying in the wind at present. Prices seem to be holding as a matter of course.

Semi-Finished Steel

A fairly heavy movement of sheet bars continues to detached tin plate mills, while shipments to non-integrated sheet mills are holding the improvement which became evident a week ago. The volume of wire rod business is exceeding seasonal expectations. A little wider interest is being displayed by forging shops, which are becoming busier on preliminary work on 1936 automobile models. Pressure for preferential prices on the part of non-integrated mills evidently has evaporated since the overthrow of the code, and base quotations on semi-finished grades are considered to be quite firm.

Bolts, Nuts and Rivets

Releases on third quarter contracts are in lighter volume than those in the first three weeks of June. The automotive industry is limiting its buying to small lots and has not thus far indicated its requirements for new model construction. Large producers are adhering concertedly to current discount cards.

Rails and Track Accessories

The local rail mill received part of the Nickel Plate order for 3000 tons of rails. Track accessory orders are in extremely small volume, being restricted largely to miscellaneous track maintenance requirements.

Reinforcing Steel

With the bulk of public works money still held in abeyance, July volume has failed to hold the pace of June. The only bright spot in this market is the more frequent appearance of private projects. Specifications are being issued for lock and dam No. 1 to be constructed on the Kanawha River near Huntington, W. Va.; reinforcing steel requirements have not thus far been estimated. Producers are applying full base prices to all jobs, but price weakness is becoming more pronounced in the jobbing trade. In some instances, variations in the application of extras have resulted in price shading, but a majority of producers continue to operate strictly in conformance with provisions set up in the now defunct code.

Cold-Finished Bars

Volume is holding the gains established earlier in the month, and, despite the loss during the Independence Day Week, is on a parity with June tonnage. This record is considered encouraging in the face of lean business from the automotive industry and the summer season. Only fill-in orders are being entered for shipment to automobile centers, and ordering against 1936 models has been limited to scattered experimental lots. Miscellaneous buying represents the bulk of current business, with farm implement and machinery makers maintaining an important position in this market.

Plates and Shapes

Official allocations of plates and shapes from the car builders which participated in the Chesapeake & Ohio order for 5125 freight cars have not yet reached producers here. A substantial tonnage of plates and small shapes will be needed for the 500 cars on which bids are being taken by the Norfolk Southern, but steel requirements probably will be placed with producers in another district. Mississippi Valley Barge Lines may decide this week on its inquiry for 20 to 30 barges, which would involve about 6000 to 9000 tons.

The structural market is rather subdued, with fresh inquiries in small volume. Awards reported here for the past week in no instance ran higher than 700 tons.

While base prices for plain material are holding, fabricators' prices are highly competitive and concessions are becoming more general.

Sheet Steel Piling

With all bidders for supplying the sheet steel piling for the Pickwick dam, Tenn., on an even basis, lots drawn late last week revealed Bethlehem Steel Co. as successful bidder on 5000 tons. The Dravo Construction Co., Pittsburgh, is low bidder on a coffer dam for raising the Emsworth dam on the Ohio River, which will require about 1790 tons. About 2000 tons of temporary piling and 170 tons of per-

manent piling probably will be specified for construction of dam No. 9 and for alterations to dam No. 8 on the Allegheny River near Kittanning, Pa.

Tubular Products

Demand appears to be holding its own, with the market offering little of new feature. Private home construction is aiding lap weld and butt weld pipe mill schedules, while fairly active drilling programs in the oil fields are supporting a steady outlet for drill pipe, casing and tubing. Seamless mechanical tubing is temporarily being adversely affected by the tapering activity on 1935 motor car models and is not expected to experience important improvement probably until late next month. Pipe mill output in this district this week is estimated at 35 per cent.

Bars

Demand continues to appear in steady volume. Producers report a well diversified list of customers, with the automotive industry at present playing an unimportant role. A few small lots have been booked for trial runs on 1936 models, but tonnage requirements are not expected to reach heavy proportions until next month. Alloy bars are being affected similarly.

Wire Products

Consumers apparently are increasing their takings of wire products, and the movement in the past week was in such volume as to astonish some conservative shippers. The improvement has been accomplished without aid from the automotive industry and in the face of drastically reduced road programs requiring wire mesh. Shipments of wire fencing are fairly heavy, while merchant items are running ahead of seasonal needs. Wire mill output in the Pittsburgh district this week is about five points higher at 35 to 40 per cent.

Sheets

Miscellaneous demand has not yet shed its steady character, and, aided by continued releases from the automotive industry, July volume is showing up remarkably well. Although sheet mill schedules for the industry at the outset of the current week are unchanged at 50 per cent of capacity, the trend is tending upward and production may reach 55 per cent by the week-end. Part of the steel being inquired for by a leading automobile producer has been purchased, and it is considered likely that more than 100,000 tons, including a large percentage of sheet steel, will have been purchased within the next fortnight. While base prices quoted on this business reflect full schedules, the waiving of extras in some instances has resulted in a substantial concession to the buyer. Demand for galvanized roofing is exceeding by far the usual requirements at this season.

Tin Plate

General line can specifications still are in volume sufficient to push output for the industry three points higher to 88 per cent of capacity. It is considered questionable by producers here that this rate can hold beyond the end of July, when a seasonal drop is considered inevitable. In the meantime, shipments are virtually in step with production, and mill warehouse stocks have been reduced to more normal proportions. Aiding the present movement is an unusually heavy demand for oil in cans and favorable pasture conditions extending the seasonal pack of milk.

Strip Steel

The large inquiry of a leading automobile producer has not thus far been translated into strip orders here. The placing of some of the tonnage, however, is expected momentarily and will be a boon to strip production, which is hovering around 35 per cent. Demand from other motor car manufacturers has shrunk in line with reduced assembly schedules and not much hope now is held out for generally heavier automotive demand until late in August. Meanwhile the trend of miscellaneous orders is encouragingly steady. Despite the efforts of a leading automotive interest to obtain lower strip prices, producers in this district are quite general in their intention to maintain full schedules.

Coke and Coal

Slightly increased activity in this market is traceable to general business activity rather than to renewed threats of a bituminous strike. The heavy accumulations attending the strike contingency last spring are being reduced, and the large consumers, including railroads and public utilities, are beginning to take their normal requirements. Production of bituminous coal has been stepped up and this week many western Pennsylvania soft coal mines will operate at capacity in anticipation of possible further strike contingencies. Foundry coke is moving in slightly heavier volume to gray iron foundries, while furnace coke finds little or no market. All fuel prices for the second week remain unchanged.

Scrap

In view of the lack of mill interest in scrap, buyers evidently are waiting out the market. Only one small independent mill in the Pittsburgh district is openly interested in covering and has been picking up small lots of No. 1 heavy melting steel at no higher than $12, delivered. It has been impossible, however, for brokers taking small orders at $12 to do much better than break even on such business. Unquestionably scrap prices in the immediate Pittsburgh district have been strengthened noticeably by the active buying in the Wheeling district, where $13 and higher has been paid for high-grade railroad steel. Ordinary No. 1 heavy melting steel at Pittsburgh remains unchanged at $12, and at the moment it is impossible to find any mill willing to pay higher than that figure.

Weekly Indications of Steel Activity

From The Iron Age

	July 23, 1935	July 16, 1935	June 25, 1935	July 24, 1934	Average, Year to Date 1935	Average, Year to Date 1934
Steel ingot operations—Per cent of capacity	43.5	40.5	38.0	27.5	45.1	45.5

	Week Ended July 23, 1935	Week Ended July 16, 1935	Week Ended June 25, 1935	Week Ended July 24, 1934	Year to Date 1935	Year to Date 1934
Fabricated structural steel awards	11,100	17,000	27,000	15,150	389,452	478,870
Fabricated plate awards	2,485	6,225	1,620	3,855	68,067	83,952
Sheet steel piling awards	5,000	0	1,240	270	28,365	37,660
Reinforcing bar awards	0	4,400	3,000	1,720	118,075	123,330

Demand Broadens in Chicago District

Inquiry for Fall Delivery Gains—Bookings Now Abreast of June—Missouri Pacific Buys 10,000 Tons of Rails

CHICAGO, July 23.—The entire substructure of the business situation seems to be slowly strengthening, and there is a degree of optimism among buyers and sellers that has not been apparent for several years. Buying is still confined to close-by needs, but there is more inquiry for fall deliveries. Price structures are holding all along the line, though the matter of quantity discounts is still one for discussion.

Ingot output remains at 49 per cent of capacity, where it is firmly entrenched by specifications that are moderately heavier than a week ago. New buying of finished steel remains at the level of the earlier weeks in July, which was moderately above June rates.

The scrap market retains a highly speculative atmosphere and prices are leaning toward the strong side. Gray iron and steel foundries have suddenly become active in taking scrap for late summer and early fall needs. Galvanized sheets are moving faster in directions to which increased shipments do not usually start until about the middle of August. Wire goods going to country areas are still in good volume and farmers are showing so much interest in farm equipment that that industry is going through the summer with very minor adjustments in operating schedules, an experience that is almost without precedence.

The Missouri Pacific has ordered 10,000 tons of rails and mills are scheduled at the present rate to the end of August. Steel producers will not give up the idea that railroad equipment buying is near at hand. There are, however, no attractive open inquiries in the Chicago area.

Pig Iron

Shipments are climbing and releases now indicate that the July movement will equal that of June whereas a week ago July was running 18 per cent below the June rate. Foundries catering to the machine tool industry are doing exceptionally well. There is more interest in new buying, though tonnages added to books are not heavy. Prices remain firm.

Cast Iron Pipe

This market remains dull, though some sellers are looking forward to better business in August and September. Chicago Heights, Ill., will take bids on July 29 on a small tonnage, and Ann Arbor, Mich., is seeking bids on 250 tons for a sewage treating plant. Sizable tonnages remain to be bought by the Sanitary District, Chicago, and the water department of Milwaukee. Prices for cast iron pipe remain firm.

Reinforcing Bars

The past week has been very quiet both in regard to inquiries and awards. With the exception of Mississippi River work there are no new projects that call for more than 50 tons each. Sprinkled among the small lettings are a few private jobs, most of which are for alterations. It is reported that all Chicago housing plans have been put to one side, and certainly overhead crossing and road work are at a standstill. Shop operations range from 50 to 60 per cent of capacity.

Rails

The Missouri Pacific has ordered 10,000 tons of rails, and distribution by the Illinois Central on rails announced a week ago was 4560 tons to Illinois Steel Co. and 3040 tons to Inland Steel Co. Accessory orders are scattered, but the week's volume is fair considering all conditions. Releases reaching mills are well spaced and operations are steady, with the promise that they will continue so until about the end of August.

Sheets

There is still a fair movement of sheets to automobile builders who are cleaning up on old models. Larger jobbers and some manufacturers are taking galvanized sheets in more liberal quantities, and this increase comes at a time well in advance of the usual late summer period when fall buying gets under way.

Sheet producers are convinced that beer cans are a foregone conclusion and that large tonnages of tin plate will move from mills for that purpose.

Wire Products

Output is holding at 40 per cent of capacity, and there are excellent prospects that this rate will be maintained. The principal supporting factor in the market at present is the tonnages of various products that are needed for public works. Among these items are woven wire fencing, wire rope and electrical cable. Reinforcing mesh, while in somewhat better demand, is very sluggish for this time of year. A few preliminary purchases have been made by automobile manufacturers who are starting work on new models. Farm areas are still contributing attractive out-of-season tonnages, but railroads, which several weeks ago gave signs of coming to life, have again withdrawn from the market except for a few minor inquiries that are widely scattered.

Plates

The Taylor Forge & Pipe Works, which will fabricate 5000 tons of steel pipe for Fort Smith, Ark., has placed plate orders with mills. In all other respects the local plate market is dull. Producers are closely scanning the railroad equipment market for possible business but nothing of great importance has as yet been developed. However, the general feeling remains that railroad car business is destined to improve in the not distant future.

Structural Material

The low bidder is announced on Lock No. 13 at Clinton, Iowa, it being the McCarthy Improvement Co., Davenport, Iowa. Bids on the Red Wing Lock in Minnesota are being taken this week. Aug. 3 is the date at Le Claire, Wis., and July 29 at New Boston, Ill. With the exception of a 3000-ton bridge at Oakland, Cal., awards are light and scattered. Fresh inquiries are dull except for the work that is to be done along the Mississippi River.

Bars

The bar market is showing remarkable staying qualities. Miscellaneous users are stepping in on a broader scale and some forgers are more active, having had releases from automobile parts makers who will supply parts for

new models. The farm implement industry is establishing somewhat of a record in that it is not experiencing a summer lull and the outlook is for a fall business that may possibly exceed the spring demand. All road machinery manufacturers remain well engaged.

Scrap

This market is in the grip of a strong speculative movement which, though in effect for about a week, seems to have lost none of its initial force. Dealers cannot buy at figures that will net them a profit and they are naturally fighting shy of a long position on new acquisitions. There is not a broker who does not feel that buyers must pay higher prices on the next transactions and that the next few weeks will bring this point to a head. In the meantime both gray iron and steel foundries are taking in more scrap in anticipation of a more active fall melt.

Fabricated Structural Steel

Lettings Again Decline—New Projects Slightly Lower

AMONG awards of 11,100 tons, which compare with 17,000 tons last week, are 3000 tons for a bridge at Oakland, Cal., and 2050 tons for 11 railroad bridges for relocating tracks in the Muskingum Conservancy District in Ohio. Other lettings are mostly in small tonnages. New projects of 9200 tons compare with 9700 tons in the previous week and 19,500 tons two weeks ago. The largest new jobs reported are 2500 tons for an addition to the Archives building in Washington and 2000 tons additional for a concentration plant for the Consolidated Copper Co. at Kimberly, Nev. Plate awards call for 2485 tons. The Pickwick Dam Landing in Tennessee, a TVA project, accounts for 5000 tons of sheet piling. New inquiries for sheet piling total 4245 tons. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

New Britain, Conn., 100 tons, manufacturing plant addition, to Berlin Construction Co.

New York, 320 tons, Cloister Museum, 178th Street, to an unnamed bidder.

New York, 410 tons, Harkness Pavilion addition, Medical Center, to American Bridge Co.

Brooklyn, 145 tons, Brooklyn Bus Corpn., inspection shed, to C. Frederick Wolf, Inc.

Long Beach, Long Island, 105 tons, grade school No. 3, to August Bellob Iron Works.

Sunnyside, New York, 290 tons, apartment house, Phipps Estate, to Nassau Iron Works.

Lackawanna, N. Y., 125 tons, Rust Furnace Co., to Pittsburgh Bridge & Iron Co.

Downington, Pa., 410 tons, Downington Paper Co. building, to Belmont Iron Works.

Wilmington, Del., 175 tons, addition to Elks Home, to Belmont Iron Works.

Baltimore, 435 tons, building for Crown Cork & Seal Co., to Belmont Iron Works.

THE SOUTH

State of Kentucky, 205 tons, highway bridge, to Lackawanna Steel Construction Co.

Grafton, W. Va., 420 tons, Tygart Valley Dam, to Spuck Iron & Foundry Co.

Brooke County, W. Va., 180 tons, State highway bridge, to Pittsburgh-Des Moines Steel Co.

Miami Beach, Fla., 440 tons. theater, to Ingalls Iron Works Co.

Travis County, Tex., 125 tons, bridge, to Virginia Bridge & Iron Co.

CENTRAL STATES

Zanesville, Ohio, 2050 tons, 11 railroad bridges, for relocating tracks in Muskingum Conservancy district; 1800 tons to Mount Vernon Bridge Co., and 250 tons to Fort Pitt Bridge Works Co.

Canton, Ohio, 160 tons, Timken Roller Bearing Co., to Fort Pitt Bridge Works Co.

Springfield, Ill., 400 tons, filtration plant, to Hansell-Elcock Foundry Co.

Fond du Lac, Wis., 200 tons, convent, to Lakeside Bridge & Steel Co.

Canton, Mo., 100 tons, gate hoists for Mississippi River dam No. 20, to Lakeside Bridge & Steel Co.

Kansas City, Kan., 700 tons, Wyandotte high school, to Kansas City Structurel Steel Co.

Milwaukee Road, 175 tons, bridge at Lake, Wis., to Milwaukee Bridge Co.

WESTERN STATES

Oakland, Cal., 3000 tons, bridge, to Ingalls Iron Works Co.

Los Angeles, 165 tons, tunnel supports for Metropolitan Water district, to Consolidated Steel Corpn.

Pittsburg, Cal., 100 tons, school, to Schrader Iron Works.

Juntura, Ore., 150 tons, gates and hoists for Agency Valley dam, to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Brownville Junction, Me., 113 tons, State bridge.

Charlestown, Mass., 100 tons, Boston Elevated Railway garage.

Dartmouth, Mass., 100 tons, State bridge.

Rome, N. Y., 250 tons, buildings for Rome State School.

State of New Jersey, 200 tons, highway bridge near Atlantic City.

Washington, 2500 tons, extension to Archives building.

THE SOUTH

East Tampa, Fla., 200 tons, bridge.

CENTRAL STATES

Wabash Railroad, 3000 tons, St. Louis River bridge, Mount Vernon Bridge Co. low bidder.

State of Ohio, 155 tons, bridges at Fort Jennings and Springfield; bids Aug. 5.

Cleveland, 250 tons, lintels for Outhwaite housing project.

Cleveland, 300 tons, structural shapes and lintels for Whiskey Island housing project.

Cleveland, 165 tons, administration building for Easterly sewage disposal plant; Hunkin-Conkey Construction Co. general contractor.

Cleveland, 460 tons, three buildings for Easterly sewage disposal plant; bids Aug. 2.

State of Indiana, 525 tons, three bridges.

Oak Park, Ill., 100 tons, theater.

Augusta, Ill., 400 tons, bridge.

Clinton, Iowa, 935 tons, lock No. 13 in Mississippi River; Central Engineering Co., Des Moines, low bidder on general contract.

WESTERN STATES

Flathead County, Mont., 342 tons, State bridge over Flathead River; bids July 30.

Boulder City, Nev., 500 tons, transmission towers for Bureau of Reclamation.

Kimberly, Nev., 2000 tons additional, concentration plant for Consolidated Copper Co.

Sausalito, Cal., 400 tons, yacht harbor; bids July 29.

Long Beach, Cal., 200 tons transit shed at berth No. 48; Atlas Scraper & Engineering Co. low bidder.

Bonneville Dam, Ore., 1480 tons, lock operating equipment; Pacific Coast Steel Corpn. low bidder.

Seattle, 100 tons, two hoists for Landsburg dam; Puget Sound Machinery Depot low bidder.

FABRICATED PLATES

AWARDS

Leetsdale, Pa., 2300 tons, 10 coal barges for Ohio River Co. to Dravo Contracting Co.

Mobile, Ala., 185 tons, two barges for United States Engineers, to Alabama Dry Dock & Shipbuilding Co.

SHEET PILING

AWARDS

Pickwick Dam, Tenn., 5000 tons, TVA project, Pickwick Dam landing, to Bethlehem Steel Co.

NEW PROJECTS

Emsworth, Pa., 1790 tons, coffer dam for raising Emsworth Dam on Ohio River; Dravo Construction Co., general contractor.

Kittanning, Pa., 2170 tons, permanent and temporary piling, dam No. 9, and alterations to dam No. 8, Allegheny River.

Hanford, Cal., 285 tons, wire; bids July 30.

Purchase of the Ford City, Pa., plant of Gears & Forgings, Inc., by Thomas W. Ward, Ltd., Sheffield, England, has been authorized by the Federal Court. The purchase included machines, tools, working drawings and manufacturing rights. The price paid was $81,276, the purchase having been recommended by the receiver, Frederick L. Leckie, Ford City Casting Co.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel — *Base per Lb.*

F.o.b. Pittsburgh ..... 1.80c.
F.o.b. Chicago ..... 1.85c.
F.o.b. Gary ..... 1.85c.
F.o.b. Duluth ..... 1.95c.
Del'd Detroit ..... 1.95c.
F.o.b. Cleveland ..... 1.85c.
F.o.b. Buffalo ..... 1.90c.
Del'd Philadelphia ..... 2.11c.
Del'd New York ..... 2.15c.
F.o.b. Birmingham ..... 1.95c.
F.o.b. cars dock Gulf ports ..... 2.20c.
F.o.b. cars Pacific ports ..... 2.35c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh ..... 1.70c.
F.o.b. Chicago ..... 1.75c.
F.o.b. Gary ..... 1.75c.
F.o.b. Moline, Ill. ..... 1.75c.
F.o.b. Cleveland ..... 1.75c.
F.o.b. Buffalo ..... 1.80c.
F.o.b. Birmingham ..... 1.85c.
F.o.b. cars dock Gulf ports ..... 2.10c.
F.o.b. cars dock Pacific ports ..... 2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh ..... 2.05c.
F.o.b. Chicago ..... 2.10c.
F.o.b. Gary ..... 2.10c.
Del'd Detroit ..... 2.20c.
F.o.b. Cleveland ..... 2.10c.
F.o.b. Youngstown ..... 2.10c.
F.o.b. Buffalo ..... 2.10c.
F.o.b. Birmingham ..... 2.10c.
F.o.b. cars dock Gulf ports ..... 2.45c.
F.o.b. cars dock Pacific ports ..... 2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh ..... 1.90c.
F.o.b. Chicago ..... 1.95c.
F.o.b. Gary ..... 1.95c.
F.o.b. Cleveland ..... 1.95c.
F.o.b. Youngstown ..... 1.95c.
F.o.b. Buffalo ..... 1.95c.
F.o.b. Birmingham ..... 1.95c.
F.o.b. cars dock Gulf ports ..... 2.30c.
F.o.b. cars dock Pacific ports ..... 2.30c.

Iron

F.o.b. Chicago ..... 1.80c.
F.o.b. Terre Haute, Ind. ..... 1.75c.
F.o.b. Louisville, Ky. ..... 2.10c.
F.o.b. Danville, Pa. ..... 1.80c.
F.o.b. Berwick, Pa. ..... 1.70c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh ..... 1.95c.
F.o.b. Chicago ..... 2.00c.
F.o.b. Gary ..... 2.00c.
F.o.b. Cleveland ..... 2.00c.
F.o.b. Buffalo ..... 2.05c.
Del'd Detroit ..... 2.15c.
Del'd eastern Michigan ..... 2.20c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

Base per Net Ton

F.o.b. Pittsburgh $50.00
F.o.b. Chicago 50.00
F.o.b. Duluth 51.00
F.o.b. Cleveland 50.00
F.o.b. Birmingham 53.00
F.o.b. Houston, Orange, Beaumont, Galveston 59.00
F.o.b. Mobile 58.00
F.o.b. New Orleans, Lake Charles, Corpus Christi 59.00
F.o.b. cars dock Pacific ports 63.00

Plates

Base per Lb.

F.o.b. Pittsburgh ..... 1.80c.
F.o.b. Chicago ..... 1.85c.
F.o.b. Gary ..... 1.85c.
Del'd Cleveland ..... 1.995c.
F.o.b. Coatesville ..... 1.90c.
F.o.b. Sparrows Point ..... 1.90c.
Del'd Philadelphia ..... 1.99c.
Del'd New York ..... 2.09c.
F.o.b. Birmingham ..... 1.95c.
F.o.b. cars dock Gulf ports ..... 2.20c.
F.o.b. cars dock Pacific ports ..... 2.35c.
Wrought iron plates, f.o.b. P'gh ..... 3.20c.

Floor Plates

F.o.b. Pittsburgh ..... 3.35c.
F.o.b. Chicago ..... 3.40c.
F.o.b. Coatesville ..... 3.45c.
F.o.b. cars dock Gulf ports ..... 3.75c.
F.o.b. cars dock Pacific ports ..... 3.90c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh ..... 1.80c.
F.o.b. Chicago ..... 1.85c.
Del'd Cleveland ..... 1.905c.
F.o.b. Buffalo ..... 1.90c.
F.o.b. Bethlehem ..... 1.90c.
Del'd Philadelphia ..... 2.015c.
Del'd New York ..... 2.0625c.
F.o.b. Birmingham (standard) ..... 1.95c.
F.o.b. cars dock Gulf ports ..... 2.20c.
F.o.b. cars dock Pacific ports 2.35c

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh ..... 2.15c.
F.o.b. Chicago ..... 2.25c.
F.o.b. Buffalo ..... 2.25c.
F.o.b. cars dock Gulf ports ..... 2.60c.
F.o.b. cars dock Pacific ports ..... 2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh ..... 1.85c.
No. 10, f.o.b. Gary ..... 1.95c.
No. 10, del'd Detroit ..... 2.05c.
No. 10, del'd Phila. ..... 2.16c.
No. 10, f.o.b. Birmingham ..... 2.00c.
No. 10, f.o.b. cars dock Pacific ports ..... 2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh ..... 2.40c.
No. 24, f.o.b. Gary ..... 2.50c.
No. 24, del'd Detroit ..... 2.60c.
No. 24, del'd Phila. ..... 2.71c.
No. 24, f.o.b. Birmingham ..... 2.55c.
No. 24, f.o.b. cars dock Pacific ports ..... 3.05c.
No. 24, wrought iron, Pittsburgh ..... 4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh ..... 2.50c.
No. 10 gage, f.o.b. Gary ..... 2.60c.
No. 10 gage, del'd Detroit ..... 2.70c.
No. 10 gage, del'd Phila ..... 2.81c.
No. 10 gage, f.o.b. Birmingham ..... 2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports ..... 3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh ..... 2.95c.
No. 20 gage, f.o.b. Gary ..... 3.05c.
No. 20 gage, del'd Detroit ..... 3.15c.
No. 20 gage, del'd Phila. ..... 3.26c.
No. 20 gage, f.o.b. Birmingham ..... 3.10c.
No. 20, f.o.b. cars dock Pacific ports ..... 3.50c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh ..... 3.10c.
No. 24, f.o.b. Gary ..... 3.20c.
No. 24, del'd Phila. ..... 3.41c.
No. 24, f.o.b. Birmingham ..... 3.25c.
No. 24, f.o.b. cars dock Pacific ports ..... 3.70c.
No. 24, wrought iron, Pittsburgh ..... 4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh ..... 3.40c.
F.o.b. Gary ..... 3.50c.
F.o.b. cars dock Pacific ports ..... 4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh ..... 3.10c.
No. 20, f.o.b. Gary ..... 3.20c.
No. 20, f.o.b. Birmingham ..... 3.70c.
No. 20, f.o.b. cars dock Pacific ports ..... 3.70c.
No. 10, f.o.b. Pittsburgh ..... 2.50c.
No. 10, f.o.b. Gary ..... 2.60c.
No. 10, f.o.b. Birmingham ..... 3.10c.
No. 10, f.o.b. cars dock Pacific ports ..... 3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh ..... 2.75c.
No. 28, Gary ..... 2.85c.
No. 28, cars dock Pacific Coast ports ..... 3.35c.

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mill $5.25
Standard cokes, f.o.b. Gary 5.35
Standard cokes, f.o.b. cars dock Pacific ports 5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $10.00
15-lb. coating I.C. 12.00
20-lb. coating I.C. 13.00
25-lb. coating I.C. 14.00
30-lb. coating I.C. 15.25
40-lb. coating I.C. 17.50

Hot Rolled Hoops, Bands, Strips and Flats under ¼ In.

Base per Lb.

All widths up to 24 in., P'gh ..... 1.85c.
All widths up to 24 in., Chicago ..... 1.95c.
All widths up to 24 in., del'd Detroit ..... 2.05c.
All widths up to 24 in., Birmingham ..... 2.00c.
Cooperage stock, Pittsburgh ..... 1.95c.
Cooperage stock, Chicago ..... 2.05c.

Cold-Rolled Strips

Base per Lb.

F.o.b. Pittsburgh ..... 2.60c.
F.o.b. Cleveland ..... 2.60c.
Del'd Chicago ..... 2.895c.
F.o.b. Worcester ..... 2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland ..... 2.90c.
No. 14, Worcester ..... 3.30c.
No. 20, Pittsburgh or Cleveland ..... 3.30c.
No. 20, Worcester ..... 3.70c.

Hot-Rolled Rail Steel Strips

Base per Lb.

F.o.b. Pittsburgh ..... 1.70c.
F.o.b. Chicago ..... 1.75c.
F.o.b. Birmingham ..... 1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade — *Per Lb.*

Bright wire ..... 2.30c.
Spring wire ..... 2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg

Standard wire nails $2.60
Smooth coated nails 2.60
Galvanized nails:
15 gage and coarser 4.60
16 gage and finer 5.10

Base per 100 Lb.

Annealed fence wire $2.45
Galvanized fence wire 2.80
Polished staples 3.30
Galvanized staples 3.55
Barbed wire, galvanized 3.00
Woven wire fence, base column 63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth, which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh, while Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

On staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

Off List

F.o.b. Pittsburgh ..... 35 and 2½ off
F.o.b. Chicago ..... 35 off

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			Wrought Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	53½	35	¼ & ⅜	+1½	+21½
½	58½	47	½	31½	15
¾	62	52	¾	36½	20½
1 to 3	64	55	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	63	54	2½ to 3½	38	25
3½ to 6	65	56	4 to 8	40	28½
7 and 8	64	54	9 to 12	38	24½
9 and 10	63½	53½			
11 and 12	62½	52½			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	51	38	¼ & ⅜	+2½	+34½
½	56½	47½	½	32½	17½
¾	61	52	¾	37½	22½
1 to 3	63	55	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2½ to 3	62	54	2½ to 4	45½	33
3½ to 6	65½	57½	4½ to 6	45	33½
7 and 8	64½	54½	7 & 8	46	33
9 and 10	63½	53½	9 to 12	41½	30
11 and 12	62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.96

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft. 5 %
12,000 lb. or ft. to 24,999 lb. or ft. 12½ %
6,000 lb. or ft. to 11,999 lb. or ft. 25 %
2,000 lb. or ft. to 5,999 lb. or ft. 35 %
Under 2,000 lb. or ft. ..... 50 %

Lapweld Steel and Knobbled Charcoal Iron Pressure Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Steel	Iron
1½ in. o.d.	13 B.W.G.	$ 9.72	$20.16
1¾ in. o.d.	13 B.W.G.	11.06	21.84
2 in. o.d.	13 B.W.G.	12.38	17.23
2¼ in. o.d.	13 B.W.G.	13.79	19.58
2½ in. o.d.	12 B.W.G.	16.58	24.19
2¾ in. o.d.	12 B.W.G.	17.54	26.46
3 in. o.d.	12 B.W.G.	18.35	28.30
3½ in. o.d.	11 B.W.G.	21.56	33.95
4 in. o.d.	10 B.W.G.	28.66	45.36
4½ in. o.d.	10 B.W.G.	35.22	50.48
5 in. o.d.	9 B.W.G.	44.25	61.86
6 in. o.d.	7 B.W.G.	68.14	102.46

Quantity Extras:

40,000 lb. or ft. ..... base
25,000 lb. or ft. to 39,999 lb. or ft. ..... plus 5%
10,000 lb. or ft. to 24,999 lb. or ft. ..... plus 12½%
2,000 lb. or ft. to 9,999 lb. or ft. ..... plus 25%
Under 2,000 lb. or ft. ..... plus 40%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago $48.40
*4-in., del'd Chicago 51.40
6-in. and larger, del'd New York 45.20
4-in., del'd New York 48.20
*6-in. and larger, Birmingham 40.00
*4-in. Birmingham 43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles 48.00
F.o.b. dock, Seattle 48.50
4-in., f.o.b. dock, San Francisco or Los Angeles 51.00
F.o.b. dock, Seattle 51.50

Class "A" and gas pipe, $3 extra.

*Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39, Birmingham, and $47.40, delivered Chicago, and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton $36.37½
Angle bars, per 100 lb 2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton $35.00
Light rails (from rail steel) per gross ton 34.00

Base per 100 Lb.

Spikes, 9/16 in. and larger $2.40
Spikes, ½ in. and smaller 2.40
Tie plates, steel 1.90
Tie plates, Pacific Coast ports 2.00
Track bolts, to steam railroads 3.55
Track bolts, no jobbers, all sizes (per 100 count) ..... 70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70, 10 and 5
Carriage bolts	70, 10 and 5
Lag bolts	70, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7 heads	70, 10 and 5
Hot-pressed nuts, blank or tapped, square	70, 10 and 5
Hot-pressed nuts, blank or tapped, hexagons	70, 10 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70, 10 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl. 1 in. diameter	70, 10 and 5
Larger than 1 in. diameter	70
Stove bolts in packages, Pittsburgh	75
Stove bolts in packages, Chicago	75
Stove bolts in packages, Cleveland	75
Stove bolts in bulk, Pittsburgh	83
Stove bolts in bulk, Chicago	83
Stove bolts in bulk, Cleveland	83
Tire bolts	60 and 5

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	35 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	87½
Upset set screw, cut and oval point	80
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Uncropped ..... $40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is $52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base ..... 2.45c.
Delivered price at Detroit is ..... 2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% NI. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Rerolling slabs	15c.
Bars	23c.
Plates	26c.
Structural shapes	23.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped ..... $29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped ..... $31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

	Per Gross Ton
Rerolling	$27.00
Forging quality	32.00

Delivered Detroit

Rerolling	$30.00
Forging	35.00

Billets Only F.o.b. Duluth

Rerolling	$29.00
Forging	34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Tube Rounds

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.

Wire Rods

(Common, base)

	Per Gross Ton
F.o.b. Pittsburgh	$38.00
F.o.b. Cleveland	38.00
Fo.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	....	....	19.00	....
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	20.75
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn From East. Pa.	21.9289	22.4289	21.9289	22.9289
Newark or Jersey City, N. J. From East. Pa.	20.9873	21.4873	20.4873	21.9873
Philadelphia From Eastern Pa.	20.3132	20.8132	19.8132	21.3132
Cincinnati From Hamilton, Ohio	19.5807	19.5807	19.0807	20.0807
Canton, Ohio From Cleveland and Youngstown	19.8402	19.8402	19.3402	20.3402
Columbus, Ohio From Hamilton, Ohio	20.64	20.64	....	....
Mansfield, Ohio From Cleveland and Toledo	20.3832	20.3832	....	....
Indianapolis From Hamilton, Ohio	20.9289	20.9289	....	....
South Bend, Ind. From Chicago	20.6935	20.6935	....	....
Milwaukee From Chicago	19.57	19.57	....	....
St. Paul From Duluth	20.94	....	....	....
Davenport, Iowa From Chicago	20.3832	20.3832	....	....
Kansas City From Granite City	21.2178	21.2178	....	....
San Francisco, Los Angeles or Seattle. From Provo	22.315	....	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $23.50

GRAY FORGE PIG IRON

Valley furnace	$18.00
Pittsburgh district furnace	18.00

CHARCOAL PIG IRON

Lake Superior furnace	$21.00
Delivered Chicago	24.2528
Delivered Buffalo	24.595

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

	Per Gross Ton
Domestic, 80% (carload)	$85.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$28.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carloads	$1.35 to $1.45
Ferrotungsten, less carloads	1.45 to 1.55
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C. f.o.b. furnace carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.50 to $12.00
No. 2 heavy melting steel	10.25 to 10.75
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	13.00 to 13.50
Rails, 3 ft. and under	13.50 to 14.00
Compressed sheet steel	11.50 to 12.00
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	8.00 to 8.50
Short shov. turnings	8.00 to 8.50
Short mixed borings and turnings	6.25 to 6.75
Cast iron borings	6.25 to 6.75
Cast iron carwheels	12.00 to 12.50
Heavy breakable cast	11.50 to 12.00
No. 1 cast	13.00 to 13.50
Railr. knuckles and couplers	14.25 to 14.75
Rail. coil and leaf springs	14.25 to 14.75
Rolled steel wheels	14.25 to 14.75
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.25 to 14.75
Low phos. plate scrap	14.00 to 14.50
Low phos. punchings	14.00 to 14.50
Steel car axles	14.25 to 14.75

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$10.00 to $10.50
Automobile hvy. melt. steel	9.50 to 10.00
Shoveling steel	10.00 to 10.50
Hydraulic comp. sheets	9.00 to 9.50
Drop forge flashings	8.00 to 8.50
No. 1 busheling	9.25 to 9.75
Rolled carwheels	11.25 to 11.75
Railroad tires	12.25 to 12.75
Railroad leaf springs	11.25 to 11.75
Axle turnings	9.50 to 10.00
Steel couplers and knuckles	11.25 to 11.75
Coil springs	12.50 to 13.00
Axle turnings (elec. fur.)	10.00 to 10.50
Low phos. punchings	13.25 to 13.75
Low phos. plates, 12 in. and under	13.25 to 13.75
Cast iron borings	5.25 to 5.75
Short shoveling turnings	5.25 to 5.75
Machine shop turnings	5.50 to 6.00
Rerolling rails	11.25 to 11.75
Steel rails, less than 3 ft.	11.75 to 12.25
Steel rails, less than 2 ft.	13.25 to 13.75
Angle bars, steel	12.25 to 12.75
Cast iron carwheels	10.75 to 11.25
Railroad malleable	12.25 to 12.75
Agricultural malleable	9.75 to 10.25

	Per Net Ton
Iron car axles	$14.75 to $15.25
Steel car axles	13.25 to 13.75
No. 1 railroad wrought	8.25 to 8.75
No. 2 railroad wrought	9.00 to 9.50
No. 2 busheling	5.25 to 5.75
Locomotive tires, smooth	10.25 to 10.75
Pipe and flues	5.25 to 5.75
No. 1 machinery cast	9.25 to 9.75
Clean automobile cast	8.75 to 9.25
No. 1 railroad cast	8.25 to 8.75
No. 1 agricultural cast	8.25 to 8.75
Stove plate	6.75 to 7.25
Grate bars	6.75 to 7.25
Brake shoes	6.75 to 7.25

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	*$9.50 to $10.50
No. 2 heavy melting steel	*8.50 to 9.50
Hydraulic compressed, new	9.50 to 10.00
Hydraulic compressed, old	7.50 to 8.00
Steel rails for rolling	12.50 to 13.50
Cast iron carwheels	11.00 to 11.50
Heavy breakable cast	10.50 to 11.00
No. 1 cast	11.00 to 11.50
Stove plate (steel works)	8.00 to 8.50
Machine shop turnings	6.00 to 6.50
No. 1 blast furnace	5.00 to 5.00
Heavy axle turnings	9.00 to 9.50
Cast borings	5.00 to 5.50
No. 1 low phos. heavy	13.75 to 14.25
Couplers and knuckles	13.50 to 14.00
Rolled steel wheels	13.50 to 14.00
Steel axles	16.00
Shafting	17.50
No. 1 railroad wrought	10.00 to 10.50
Spec. iron and steel pipe	8.50 to 9.00
No. 1 forge fire	9.50 to 10.00
Cast borings (chem.)	10.50 to 13.00

* Brokers' buying price for export.

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$7.75 to $8.25
No. 2 heavy melting steel	6.25 to 6.75
Scrap rails for melting	7.75 to 8.25
Loose sheet clippings	4.25 to 4.75
Bundled sheets	5.75 to 6.25
Cast iron borings	4.25 to 4.75
Machine shop turnings	4.25 to 4.75
No. 1 busheling	5.75 to 6.25
No. 2 busheling	2.50 to 3.00
Rails for rolling	8.75 to 9.25
No. 1 locomotive tires	7.00 to 7.50
Short rails	11.25 to 11.75
Cast iron carwheels	7.75 to 8.25
No. 1 machinery cast	9.00 to 9.50
No. 1 railroad cast	8.25 to 8.75
Burnt cast	5.75 to 6.25
Stove plate	5.75 to 6.25
Agricultural malleable	7.75 to 8.25
Railroad malleable	8.75 to 9.25

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	9.50 to 10.00
Compressed sheet steel	9.50 to 10.00
Light bundled sheet stampings	7.75 to 8.25
Drop forge flashings	8.50 to 9.00
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	6.75 to 7.25
No. 1 busheling	9.00 to 9.50
Steel axle turnings	9.00 to 9.50
Low phos. billet crops	14.00 to 14.50
Cast iron borings	6.75 to 7.25
Mixed borings and short turnings	6.75 to 7.25
No. 2 busheling	6.75 to 7.25
No. 1 cast	12.50 to 13.00
Railroad grate bars	7.00 to 7.50
Stove plate	7.50 to 8.00
Rails under 3 ft.	13.00 to 13.50
Rails for rolling	15.50 to 16.00
Railroad malleable	13.50 to 14.00
Cast iron carwheels	10.75 to 11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.75
No. 2 heavy melting scrap	9.75
Scrap rails	11.00
New hydraul. comp. sheets	9.75
Old hydraul. comp. sheets	8.75
Drop forge flashings	9.75
No. 1 busheling	9.75
Hvy. steel axle turnings	$8.00 to 8.50
Machine shop turnings	4.50 to 5.00
Knuckles and couplers	11.50 to 12.00
Coil and leaf springs	11.50 to 12.00
Rolled steel wheels	11.50 to 12.00
Low phos. billet crops	12.00 to 12.50
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and turnings	6.50 to 7.00
Cast iron borings	6.50 to 7.00
No. 2 busheling	6.50
Steel car axles	11.50 to 12.00
Iron axles	11.50 to 12.00
No. 1 machinery cast	11.50 to 12.50
No. 1 cupola cast	10.50 to 11.00
Stove plate	9.00 to 9.50
Steel rails, 3 ft. and under	12.50 to 13.00
Cast iron carwheels	11.00 to 11.50
Industrial malleable	12.00 to 13.00
Railroad malleable	12.00 to 13.00
Chemical borings	8.00 to 8.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	$8.50 to $8.75
No. 1 heavy melting steel	6.15 to 6.65
*Scrap T rails	8.50 to 8.75
Scrap rails	6.40 to 6.65
*No. 2 steel	7.25 to 7.50
No. 2 steel	5.15 to 5.65
Breakable cast	5.25 to 5.50
Machine shop turnings	1.75 to 2.00
*Machine shop turnings (short)	4.00 to 4.25
Bundled skeleton, long	4.25 to 4.50
Forge flashings	4.25 to 4.50
Shafting	11.75 to 12.00
Steel car axles	11.50 to 12.00
Cast iron borings, chemical	6.50 to 7.00
*Stove plate	6.25 to 6.50

Per gross ton delivered consumers' yards:

Textile cast	$9.00 to $9.50
No. 1 machinery cast	9.00 to 9.50
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	*$7.00 to †$8.50
No. 2 heavy melting steel	*5.50 to †7.50
Heavy breakable cast	6.00 to 6.50
No. 1 machinery cast	7.00 to 7.50
No. 2 cast	†6.50
Stove plate	†6.25
Steel car axles	13.50 to 14.00
Shafting	12.75 to 13.00
No. 1 railroad wrought	7.00 to 7.50
No. 1 yard wrought, long	6.00 to 6.50
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rolling	8.50 to 9.00
Short shoveling turnings	2.00 to 2.50
Machine shop turnings	2.00 to 2.50
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	4.00 to 4.50

Per gross ton, delivered local foundries:

No. 1 machinery cast	$10.00
No. 1 hvy. cast (cupola size)	9.00
No. 2 cast	7.50

* For direct car loading only.
† Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$9.00 to $9.50
Scrap steel rails	10.00 to 10.50
Short shoveling turnings	7.00
Stove plates	7.00
Steel axles	11.50
Iron axles	11.50
No. 1 railroad wrought	7.00
Rails for rolling	12.50
No. 1 cast	9.50 to 10.00
Tramcar wheels	10.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$8.75 to $9.25
No. 1 heavy melting	8.25 to 8.75
No. 2 heavy melting	7.50 to 8.00
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	10.00 to 10.50
Railroad springs	11.00 to 11.25
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.25 to 8.75
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	10.50 to 11.00
Machine shop turnings	2.75 to 3.25
Heavy turnings	5.50 to 6.00
Steel car axles	12.50 to 13.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	6.00 to 6.50
Steel rails less than 3 ft.	12.00 to 12.50
Steel angle bars	9.50 to 10.00
Cast iron carwheels	8.00 to 8.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	10.50 to 11.00
No. 1 railroad cast	8.00 to 8.50
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$8.00 to $8.50
Borings and short turnings	5.00 to 5.50
Long turnings	$4.25 to $4.75
No. 1 machinery cast	11.00 to 11.50
Automotive cast	11.25 to 11.75
Hydraul. comp. sheets	8.50 to 9.00
Stove plate	6.75 to 7.25
New factory busheling	7.50 to 8.00
Old No. 2 busheling	4.50 to 5.00
Sheet clippings	5.75 to 6.25
Flashings	7.50 to 8.00
Low phos. plate scrap	8.25 to 8.75

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$7.00
Rails scrap	8.00	8.00
Machine shop turnings	3.00	3.00
Boiler plate	4.50	4.50
Heavy axle turnings	4.50	4.00
Cast borings	4.00	3.50
Steel borings	2.00	2.00
Wrought pipe	3.50	3.50
Steel axles	7.00	8.00
Axles, wrought iron	7.00	8.00
No. 1 machinery cast	9.00	9.00
Stove plate	5.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	10.50c.
Iron, low phos., Swedish, average 68½% iron	10.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	9.50c.
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	22c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½%	20c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered	$16.00 to $16.50
Tungsten, domestic, scheelite, delivered	16.50

	Per Gross Ton
Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.00 to 16.50
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic Seaboard	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all-rail shipment	$14.00 to $15.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	14.00 to 15.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	14.00 to 15.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.25 to $3.50
Foundry, f.o.b. Connellsville Prompt	4.90 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	9.24 to 9.72
Foundry, by-product, Phila.	9.03
Foundry, by-product, Cleveland, delivered	9.25
Foundry, Birmingham	4.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.45 to $1.65
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.95
Gas coal, ¾-in., f.o.b. Pa. mines	1.85 to 2.35
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.95
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. del'd Chicago
No. 3 industrial fuel oil	4.75c.
No. 5 industrial fuel oil	3.75c.

	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.25c.
No. 4 industrial	5.12½c.
No. 5 industrial	4.25c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	5.00	40.00
New Jersey	50.00	42.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	55.00
Silica clay, per net ton	8.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	42.00

Magnesite Brick

	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically Bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported f.o.b. Baltimore and Chester, Pa.	$45.00
Domestic, f.o.b. Baltimore and Chester	40.00
Domestic, f.o.b. Chewelah, Wash.	32.50

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 count, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lbs.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars:	
Rounds and hexagons	3.35c.
Flats and squares	3.35c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.
	Per Cent Off List
Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nute, sq. tap. or	
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hxe. tap or	
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87½
Cut point set screws	80
Flat head bright wood screws	50 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	2.95†
Cement c't'd nails, base per keg	2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b., Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.28c.
Iron bars	3.26c.
Iron bars, swed. charcoal	6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	4.31c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheeb (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	4.50c.
Long terne sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x ⅛ in. and larger	3.65c.
Open hearth spring steel, 4.00c. to 10.00c.	
Common wire nails, base, per keg	$3.21
	Per Cent
Machine bolts, cut thread:	Off List
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.45c.
Bars, soft steel or iron	3.20c.
Cold-fin. rounds, shafting, screw stocks	3.60c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts: All quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	2.93c.
‡Reinforce. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.61c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.65c.
†Galvanized sheets (No. 24)	4.30c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	2.10c.
Cold-finished steel bars	3.25c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

†Outside delivery 10c. less.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.42c.
Bars, soft steel or iron	3.17c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars	3.57c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1-in. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$22.66
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.35
4-in.	45.30

BUFFALO

Base per Lb

Plates	3.38c.
Struc. shapes	3.25c.
Soft. steel bars	3.00c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.40c.
Round and hex.	3.40c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.63c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb. (2500-lb. lots or under)	3.55
(Over 2500 lb.)	3.45

BOSTON

Base per Lb.

Beams, channels, angles, tees, zees	3.51c.
H beams and shapes	3.51c.
Plates—sheered, tank and univ. mill, ¼ in. thick and heavier	3.56c.
Floor plates, diamond pattern	5.36c.
Bar and bar shapes (mild steel)	3.35c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.60c.
Tire steel	4.60c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.75c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga.	5.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft and bars	3.04c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.
Galvanized sheets (No. 24)	4.72c.
Bands	3.39c.
Hoops	3.39c.
Cold-finished bars	3.49c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts	70 and 5 per cent off list

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

*Price applies to 1,000 lb. and over.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.31c.
Soft steel bars	3.06c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.66c.
Cold-finished steel bars	3.61c.
Cold-rolled strip	3.30c.
Structural rivets (keg lots)	3.86c.
Boiler rivets (keg lots)	3.96c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
Black annealed wire	3.10c.
Com. wire nails	2.90c.
Cement coated nails	2.90c.
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Hot-pressed nuts, sq. and hex., tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 3499 lb. On cold-finished bars the prices are for orders of 300 to 499 lb.

ST. PAUL

Base per Lb.

Mild steel bars	3.20c.
Structural shapes	3.45c.
Plates	3.45c.
Cold-finished bars	3.87c.
Bands and hoops	3.55c.
Hot-rolled annealed sheets, No. 24	3.90c.
Galvanized sheets, No. 24	4.50c.
Cold-rolled sheets, No. 20	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On cold-finished bars, hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over.

BALTIMORE

Base per Lb.

*Mild steel bars	2.95c.
*Iron bars	2.95c.
*Reinforcing bars	2.95c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheet, No. 10	3.10c.
Hot-rolled annealed sheets, No. 24	3.60c.
Galvanized sheets, No. 24	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
Cold-rolled rounds	3.58c.
Cold-rolled squares, hex. and flats	3.58c.
Rivets	4.40c.
Bolts and nuts, per cent off list	60 and 10

*Quantity extras per size apply. †Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over, base: 1500 lb. to 1999 lb., add 15c. per 100 lb.; 1000 lb. to 1499 lb., add 30c.; 0 to 999 lb., add 50c.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.31c.
Iron bars	3.31c.
Reinforcing bars	3.31c.
Structural shapes	3.56c.
Plates	3.56c.
Hot-rolled sheets, No. 10	3.36c.
Hot-rolled annealed sheets, No. 24	4.21c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.61c.
Cold-finished bars	3.98c.

MEMPHIS

Base per Lb.

Mild steel bars	3.41c.
Shapes, bar size	3.41c.
Iron bars	3.41c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets, No. 10	3.46c.
Hot-rolled annealed sheets, No. 24	4.36c.
Galvanized sheets, No. 24	4.96c.
Steel bands	3.71c.
Cold-drawn rounds	3.85c.
Cold-drawn flats, squares, hexagons	6.45c.
Structural rivets	4.25c
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.60c.	3.55c.
Shapes, standard	3.55c.	3.60c.	3.55c.
Soft steel bars	3.60c.	3.60c.	3.60c.
Reinforcing bars, f.o.b cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.70c.	3.75c.
Galv. sheets (No. 24)	5.00c.	4.95c.	5.00c.
Cold finished steel:			
Rounds	5.95c.	5.85c.	6.00c.
Squares and hexagons	7.20c.	7.10c.	7.25c.
Flats	7.70c.	7.60c.	8.25c.
Common wire nails—base per keg less carload	$3.30	$3.40	$3.30

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

	Base per Lb.
High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Copper Sales Continue in Moderate Volume—Prime Western Very Strong

Tin Buyers Delay Purchases as London Tin Pool Disorganizes Spot Market —June Shipments of Lead 6000 Tons Under May

NEW YORK, July 23.—With consumers constantly in the market for additional supplies, the electrolytic copper market is in an extremely healthy condition. Sales yesterday amounted to 1137 tons, making the month's total to date about 66,000 tons. About half of this tonnage is for delivery prior to Sept. 15 and the remaining half will be released some time in October. Oddly enough, producers did not take advantage of the recent phenomenal buying to elevate prices. However, there is a general opinion among sellers that the red metal will go above the current 8c. level in the fall if any reasonable volume of business matures to support such a rise. June deliveries of all kinds of copper amounted to 36,000 tons, as compared with 39,000 tons in May. Domestic production of mine and scrap copper was 34,000 tons in June, and total production of all other countries was almost 78,000 tons. Total stocks in the United States now amount to 273,300 tons.

Consumption in Europe is well maintained. Although business with Germany is slack owing to financial difficulties, both Hungary and Russia have recently purchased fair quantities of metal. Electrolytic copper was available this morning in Europe at 7.85c. a lb., c.i.f. usual Continental base ports, and a fair tonnage was reported to have changed hands. This 7.85c. price level is about as high as the foreign market can go with the United States market holding at 8c.

Tin

With tin plate operations up three points, the outlook for tin is very encouraging. Domestic buyers, however, have avoided the market during the past week because of the unsettlement in London occasioned by manipulations of the International Committee's tin pool. With a fair supply of tin on hand, the pool operators yesterday created a condition reminiscent of conditions around 1926 when there was an actual shortage of tin. The price for spot Standard rose yesterday by £9 but subsequently dropped £8 10s. Therefore for a time it was next to impossible to buy or borrow spot tin. American buyers have not suffered as much from this artificial famine as have European consumers. Users here have had some stocks on hand and have been willing to sell or exchange some of this metal. Therefore the disorganization which has appeared in the spot market is a reflection entirely of conditions abroad. Spot Straits was priced at 52.45c. a lb. this morning at New York. On first call in London, spot and future Standard opened this morning at £232 10s. and £223 15s. respectively and Straits at Singapore was quoted at £232 5s.

Lead

Prices are steady at 4c. a lb., St. Louis, and 4.15c., New York, with a moderate amount of fresh business coming in each day. A little over 20,000 tons has already been purchased for August delivery, and consumers are expected soon to come into the market for September requirements. It is quite possible that a moderate price rise will accompany this demand for September metal, particularly if the demands are confined to a narrow period and urgent in character.

Zinc

Improved activity among the galvanizers has reflected favorably in the spelter market. Total bookings of Prime Western and brass special last week amounted to almost 5000 tons, as compared with 1225 tons sold in the period a week ago. In spite of this pickup in fresh business, undelivered tonnages were reduced 400 tons to a 23,800-ton level during the week. A moderate amount of metal is still available at 4.30c., East St. Louis, and 4.67½c., New York, but some sellers are none too anxious to dispose of large forward commitments at this price level.

The Week's Prices. Cents Per Pound for Early Delivery

	July 17	July 18	July 19	July 20	July 22	July 23
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.75
Lake copper, N. Y.	8.12½	8.12½	8.12½	8.12½	8.12½	8.12½
Straits tin, spot, New York	52.50	52.45	52.55	....	52.75	52.45
Zinc, East St. Louis	4.30	4.30	4.30	4.30	4.30	4.30
Zinc, New York†	4.67½	4.67½	4.67½	4.67½	4.67½	4.67½
Lead, St. Louis	4.00	4.00	4.00	4.00	4.00	4.00
Lead, New York	4.15	4.15	4.15	4.15	4.15	4.15

*Refinery quotations; price ¼c. higher delivered in Connecticut.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19c. to 21c. a lb., delivered.
Aluminum, No. 12 remelt, No. 2 standard, in carloads, 16.25c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.75c. a lb., New York.
Brass ingots, commercial 85-5-5-5, 8c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	53.50c. to 54.50c.
Tin, bar	55.50c. to 56.50c.
Copper, Lake	9.00c. to 10.00c.
Copper, electrolytic	9.00c. to 9.50c.
Copper, castings	8.75c. to 9.75c.
*Copper sheets, hot-rolled	15.00c.
*High brass sheets	13.62½c.
*Seamless brass tubes	15.37½c.
*Seamless copper tubes	15.25c.
*Brass rods	12.12½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.62½c. to 5.62½c.
Lead, bar	5.62½c. to 6.62½c.
Lead, sheets	7.75c.
Antimony, Asiatic	13.50c. to 14.50c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	29.50c. to 30.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

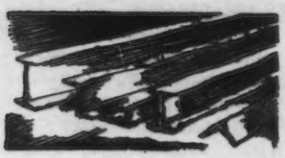
Tin, Straits pig	56.00c.
Tin, bar	58.00c.
Copper, Lake	9.00c.
Copper, electrolytic	9.00c.
Copper, castings	8.25c.
Zinc, slabs	5.85c. to 6.10c.
Lead, American pig	4.65c. to 5.00c.
Lead, bar	5.00c.
Antimony, Asiatic	15.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	60.00c.
Solder, ½ and ½	32.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.75c.	6.50c.
Copper, hvy. and wire	5.62½c.	6.12½c.
Copper, light and bottoms	4.62½c.	5.12½c.
Brass, heavy	3.00c.	3.62½c.
Brass, light	2.25c.	3.00c.
Hvy. machine composition	4.87½c.	5.37½c.
No. 1 yel. brass turnings	4.00c.	4.50c.
No. 1 red brass or compos. turnings	4.25c.	4.75c.
Lead, heavy	2.87½c.	3.25c.
Zinc	2.25c.	2.62½c.
Cast aluminum	10.62½c.	11.75c.
Sheet aluminum	12.00c.	13.50c.

Eastern Pennsylvania Rate Up One Point to 28 Per Cent



Miscellaneous Buying Improves—Autobody Fabricators About Ready for Fall Production—Scrap Trend Uncertain

PHILADELPHIA, July 23.—*The major consuming outlets in this area continue to be distinterested in new purchases of steel. Miscellaneous buying, however, has shown signs of improving since the holiday period, and most sellers are looking forward to a steady trend upward in the volume of bookings.* Autobody stamping plants are preparing to order fall requirements, and stove, radio and boiler makers all expect better production activity during the next month. Although the local shipyards will probably receive additional Navy awards, there is little expectation of an improvement in private work over the turn of the year. There is still no indication that railroads will order more than their routine quarterly requirements.

Bethlehem's Steelton plant will probably shut down its three active furnaces at the end of the month. Worth Steel Co. and Alan Wood are each operating one open-hearth, and the Pencoyd producer continues to melt in three furnaces with one small structural mill scheduled for two turns daily. Lukens has placed two furnaces in operation but expects to shut down one furnace for repairs during the next week. Operations at Sparrows Point, Md., and at Bethlehem have improved slightly, and the district operating rate is consequently one point higher at 28 per cent of capacity.

Pig Iron

The total foundry melt of the district is holding up surprisingly well. Consequently new orders and releases on old contracts are currently in better volume than most sellers had expected. Nevertheless, day-to-day ordering continues to be confined to carlots for immediate shipment, with little interest being displayed even in late third quarter deliveries. Naturally enough there is no interest in fourth quarter business, and sellers do not expect any rush of business even after year-end prices are announced.

Warehouse Business

Although individual orders are small, aggregate July demand is running a little ahead of June. Most warehouses are looking forward to a further improvement in August. Prices are generally firm and unchanged, with no particular grade of steel in heavy demand.

Bars, Plates and Shapes

Demand for bars continues to be discouraging, although miscellaneous orders for plates are appearing in slightly better volume. Several orders for plates, each totaling over 100 tons, were placed during the week and a 100-ton standpipe at Quakertown, Pa., will probably be awarded in the next few days. Structural steel orders continue to lag, mostly as a reflection of the standstill in state highway construction. Belmont Iron Works will supply 400 tons for a Downingtown, Pa., paper company, and also 160 tons for an Elks' home at Wilmington, Del. Additional projects up for bidding are a 200-ton bridge in Atlantic County, N. J., a silk mill at Allentown, Pa., which will require 200 tons, and a post office at Reading, Pa., which specifies about 400 tons of shapes.

The New York Shipbuilding Corpn., Camden, N. J., has reopened its plant under protest from strikers. It is expected that shipments to this point will again be released after a delay of several months occasioned by the strike.

Sheets and Strip

Stove makers are purchasing heavier quantities of light angles, blue-annealed sheets and enameling sheets. Radio makers are more interested in strip. A local autobody fabricating plant has purchased a small tonnage of long, wide sheets to try out its new Chrysler dies and expects to make a more substantial purchase in the next 10 days. The Studebaker dies are not yet completed, but production will soon be started on Ford truck models, as 1936 dies are practically the same as those used for the 1935 model. The autobody stamping plants here expect to confine their purchases of cold-rolled steel to nearby mills as much as possible. However certain types of wide, long sheets must necessarily be purchased in the Pittsburgh district, as nearby mills are not prepared to produce this material.

Imports

The following iron and steel imports were received here last week: 1744 tons of pig iron from British India, 1000 tons of the same product from England and 225 tons from Norway, 474 tons of chrome ore and 31 tons of beryllium ore from British South Africa, and 52 tons of steel tubes and 40 tons of steel bars from Sweden.

Scrap

All sellers are preaching strength in scrap and possible price advances, but buyers are discounting this talk and insist that there is no great need for supplies in view of the poor mill operations in this district. The attitude of both buyers and sellers is natural enough, although the two views have confused the market to some extent. There is not a plentiful supply of scrap available at current prices, but some of this tightness comes from dealers holding on to yard accumulations in expectation of higher prices. It is quite possible that export demand will slump off to some extent next month, but sellers believe that domestic mills will be in the market by that time to take up the slack. No. 2 steel is very tight in the current market, with heavy shipments going abroad and five domestic mills taking deliveries on old contracts. Phoenixville continues to secure fair amounts of No. 2 and stove plate at $9.50 and $8.50 a ton, respectively, and Worth is obtaining small amounts of No. 1 locally at $10. Two boats now loading at Port Richmond will leave by the end of the week, and the boat which has been loading at Baltimore has cleared for Japan. At least two more boats are expected to leave Port Richmond before the end of the month.

Scrap Higher At Detroit

DETROIT, July 23.—Prices of many scrap items, including heavy melting steel, hydraulic bundles and flashings, have advanced again the past week, the increases ranging from 25c. to 50c. a ton. Dealers, anticipating expansion of steel making during the next month, are reluctant to sell at today's figures, preferring to hold stocks for higher prices.

Rail Order Pending In South

BIRMINGHAM, July 23.—Routine steel demand has been slightly better the past two weeks, but current business continues on a day-to-day small-order basis. There has been little change in the tendency of jobbers and consumers to buy for immediate needs only. The same conditions also prevail in the pig iron market. Pig iron producers are largely dependent on the daily run of orders, as there is comparatively little advance tonnage on their books.

This district is interested in the proposed purchase of 12,000 tons of rails by the Seaboard Air Line Railroad, as it is hoped that this order will be placed with the local rail mill, which has been closed since the middle of last month.

Blast furnace and open-hearth operations remain unchanged, six blast furnaces and seven open-hearth units being worked. This same schedule will be maintained during the present week.

Current pipe business is also light, orders being mostly in one or two carload lots.

Business Volume Sustained at St. Louis

ST. LOUIS, July 23.—While buying of pig iron is light, being confined to spot business, shipments have been holding up well during July, and the summer lull is not so pronounced as had been expected. Melters have expressed the opinion to producers that business this fall should be greatly improved and they are decidedly optimistic, and yet they are holding off in placing their orders for pig iron. This hesitancy is said to be due to a feeling that prices of pig iron would break when the codes were ended and which still prevails to some extent. However, makers insist that prices will be maintained.

Steel mill operations show some falling off, but this is said to be due to an accumulation of ingots rather than to lack of business. Prices are unchanged.

Business of the Granite City Steel Co. during July has been considerably ahead of seasonal expectations, new business in galvanized sheets and tin plate being especially gratifying, with some buying also of hot-rolled sheets.

Fabricating plants in the district are said to be operating at an average of about 25 to 30 per cent of capacity, with 60 per cent the highest rate of any one of seven concerns. The Central Engineering Co. of Des Moines, Iowa, is the low bidder on the general contract for lock No. 13 in the Mississippi River at Clinton, Iowa, requiring 935 tons of structural steel and 600 tons of reinforcing bars. The State of Michigan will take bids shortly on highway projects requiring 2000 tons of wire mesh.

The scrap market is very firm, outside offerings being light. Miscellaneous standard-section rails and railroad springs are 25c. a ton higher, and rails for rolling and steel rails less than 3 ft. are 50c. a ton up, the first price changes in weeks. Some buying by the mills in the district is expected by Aug. 1. The St. Louis-San Francisco Railway has issued a list of 3500 tons of scrap, including 1000 tons of rails and 1000 tons of miscellaneous scrap.

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Railroad Equipment

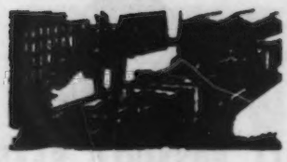
Lang Hai Railway, China, is inquiring for 10 locomotives. Chung-Tse Chien is managing director at Nanking, China.

RAILS

Missouri Pacific has bought 10,000 tons of 112-lb. rails for October, November and December delivery for 56½ miles of track between St. Louis and Little Rock, Ark., St. Louis and Ottawa, Kan., and the Omaha, Neb., Joplin, Mo., division.

Nickel Plate has placed 4000 tons of rails, which were divided among three mills.

Further Rise in Output In Cleveland District



Rate Advances Two Points to 37 Per Cent—Automobile Makers Place Orders for Sheets—Concrete Bar Prices Shaded

CLEVELAND, July 23.—Ingot output in the Cleveland-Lorain district advanced two points to 37 per cent of capacity this week and the Corrigan, McKinney Steel Co. will have two additional furnaces in operation before the end of the week, adding four points to the operating rate.

Several automobile manufacturers placed orders for sheets for August delivery for new models on which they plan to get under production around Sept. 1. This business came somewhat as a surprise, as buying of steel for new cars was not expected until about Aug. 15. Some bar tonnage for new cars also was placed. In addition, the Ford Motor Car Co. came into the market for a large tonnage of steel, mostly sheets. Automobile rim manufacturers also placed some new tonnage. Renewed activity has appeared in pig iron, largely due to automotive demand.

The slump in the demand for finished steel in July has not materialized to the extent that was expected. While business with some steel manufacturers is slightly less than last month, sales by others in this district are equal to June. One sales office is running 10 per cent ahead of last month. Inquiry for steel in the construction field for public work is somewhat more active. The Nickel Plate railroad has placed 4000 tons of rails and has divided orders for track fastenings between several makers. Concessions have appeared on reinforcing bars which are attributable to shading by distributers.

Pig Iron

Shipments and sales have gained sharply, the gain being largely from the automotive industry. Shipping orders of a leading Lake furnace interest, which have been running somewhat behind June, are now over 50 per cent ahead of last month. This producer sold 6000 tons during the week, including two 1000-ton lots. Some of the automobile foundries that had not been taking iron for some time have issued releases. Demand from the agricultural implement manufacturers continue good. Miscellaneous small-lot orders show some increase.

Bars, Plates and Shapes

Orders for steel bars for new automobile models were placed by two or three motor car manufacturers and by some of the forge shops during the week. Business is holding up well from manufacturers of farm equipment, with whom prospects for good operations during the fall are excellent. July business in this territory will fall only slightly below that of June. Building for the Cleveland sewage disposal plant will require 1200 tons of shapes and reinforcing bars. Ohio is asking for bids for a small tonnage of structural shapes for bridge work, this being the first State inquiry that has come out for months. Carload orders for plates are fair.

Sheets

The market is showing renewed vigor as a result of a purchase of considerable tonnage of sheets for new models of automobiles. Orders were placed during the past few days by General Motors units, the Chrysler and Hudson companies and by two Detroit automobile body manufacturers. These sheets are for August delivery, and in some cases early shipment is requested. The Ford Motor Co. also has been buying and is expected to purchase 60,000 to 100,000 tons altogether. While activity among consumers in this territory has not been stimulated, sales are about on a par with June. Demand for galvanized sheets from makers of building material is well maintained. Business is slack from manufacturers of refrigerators and other household equipment. The local sheet mills, including the continuous hot mill, are operating at 65 per cent of capacity this week, and the Monroe, Mich., plant has resumed operations.

Strip Steel

Increased buying by the automotive industry does not seem to have reached the strip manufacturers as yet. Orders are light, particularly for cold-rolled strip. Operation of the local cold mill has been further reduced to 20 per cent of capacity.

Reinforcing Bars

A concession of approximately $1.50 a ton from the established price on new billet steel reinforcing bars was quoted by a distributer on an inquiry of 250 tons for the Ohio FERA. While there have been unverified reports of shading by distributers, this is the first open test of the prices in this territory since the steel code was abandoned. There were three bids below the regular price, the smallest concession being only 10c. a ton. Cleveland has placed the general contract for an administration building for the East Side sewage disposal plant, which will take 266 tons of bars, and is asking for bids for three other buildings in the same project, requiring 340 tons.

Scrap

The market is very firm, with prices tending upward. No. 1 heavy melting steel has brought $12.50 for a small tonnage purchased by a Valley district mill. Dealers are paying $12 to $12.25 for No. 1 steel for delivery to Youngstown and Sharon, an advance of 25c. a ton over a week ago. The Cleveland market is inactive. Prices have advanced 25c. to 50c. a ton on leading steel-making grades. With a decrease in production of industrial scrap and a disposition among dealers to hold scrap for higher prices, offerings to brokers having outstanding orders are rather light.

Foundry Melt Up At Cincinnati

CINCINNATI, July 23.—Speculative activity among scrap dealers has given the market an unreal appearance of strength. Expectation of trade improvement in the fall brought highly competitive bidding for available material, forcing bids temporarily beyond safe margins of profit. In fact, bids in excess of recent sale prices were reported. Mills, however, generally refuse to accept new contracts. One sale of 1200 tons of miscellaneous scrap, the past week, at prices close to current schedules, reveals that prices have not moved upward. This is the first sizable order in recent months, current business being for immediate use. Users are reported to have fair inventories and are not influenced by talk of higher prices in the fourth quarter.

Well-sustained demand for sheet

steel for miscellaneous as well as automotive sources is keeping mill operations at 55 per cent of capacity output. Prices are firm, consumers generally accepting quotations and showing no disposition to seek cheaper material. Galvanized sheets are particularly active, sales being above 75 per cent of mill capacity.

Demand for pig iron is beyond seasonal expectation. With all third-quarter contracting finished, current business averaged, the past week, about 800 tons to supply melters' needs. Activity in the machine tool plants has swelled foundry operations sharply and in some instances lack of employable skilled labor is definitely handicapping melters.

Output Up At Buffalo

BUFFALO, July 23.—With Bethlehem's Lackawanna plant operating nine open-hearths, Republic Steel Corpn. operating four and Wickwire-Spencer Steel Corpn. one, and with the Seneca sheet division of Bethlehem running at 50 per cent of capacity, steel activities in this district are at their highest point in several summers.

Pig iron business is steady, with principally small tonnages involved.

The scrap market shows some strength, with considerable activity for the summer time. One large mill bid $11 for No. 1 heavy melting steel from railroad lists and did not get it. Some scattered sales of No. 1 machinery cast scrap and short rails have been made. A sale of approximately 2000 tons of short shoveling steel turnings at $6.75 to $7 is reported. It is said that dealers are offering as much as $6.75 for this material to fill orders. The delivered price of short shoveling steel turnings at Tonawanda is about $7.25, with a 63c. rate plus emergency charge to be absorbed.

District Court Finds for National Machinery Co.

S. H. WEST, judge of the District Court of the United States for the Northern District of Ohio, on July 9 found for the National Machinery Co. in connection with the master's report on one of the patents involved in an infringement suit against Ajax Mfg. Co., Cleveland.

The original report, which concerned extension header slides and die slides of a new line of air clutch forging machines produced by the latter company, held that patents 1,297,101 and 1,683,956, held by the National Co. were invalid and hence not infringed.

The decree of the District Court finds that the first patent was valid and hence has been infringed and refers the case to a special master for an accounting.

Large Bar Letting At Los Angeles

LOS ANGELES, July 22.—The Metropolitan Water District of Southern California will open bids here Aug. 19 under Specification No. 109, which involves the heaviest reinforcing bar tonnage ever placed on the Pacific Coast under one contract. The district is calling for bids for the delivery of 72,470 tons prior to July 1, 1936, and alternates which call for the delivery of 104,640 tons prior to Jan. 1, 1939. The steel, to be used on the Colorado River aqueduct, is divided as follows:

	Delivery Prior to July 1, 1936, Tons	Delivery Prior to Jan. 1, 1939, Tons
Rail steel or hard billet bars	23,300	34,610
Intermediate cut and bent bars	12,550	23,000
Modified intermediate, fabricated into hoops	24,470	26,180
Plain rods and bars	12,150	20,850
	72,470	104,640

Pig Iron More Active At Boston

BOSTON, July 23.—The pig iron market is somewhat more active in terms of sales, and there are several inquiries for limited tonnages, including one for charcoal iron. Requests for deliveries of iron purchased for third quarter delivery have come from machine tool manufacturers. Hot sticky weather has forced stove manufacturing and many other foundries to close, and it is reported that no foundry operated more than two days of last week. Furnaces are holding firmly to former code prices.

A steamer left here Sunday, July 21, with approximately 4000 tons of No. 1 and No. 2 steel for Italy. It went first to Providence, R. I., where an additional 2000 tons is being loaded. Italy has purchased at least two steel steamers that will be scrapped when they reach Genoa. Local exports for July to date aggregate 19,683 tons. Otherwise the scrap market has been rather quiet, with no changes in prices. Sentiment among shippers to Pennsylvania consuming points continues optimistic. It is believed that market will show more life next month.

With three 100-ton lots and several smaller jobs being figured, the fabricated structural steel market is more active than at any previous time this month.

Orders for Heavy Products Bolster Demand at New York

Tin Plate Bookings Are Also in Good Volume—July Steel Sales Compare Favorably With Those of Previous Month

NEW YORK, July 23.—Finished steel bookings are holding up exceptionally well for the season. In the case of some selling offices commitments to date this month are fully abreast of those for the same period in June. Both manufacturing orders and shipping releases of tin plate have been in good volume. An unexpected bulge in the pea pack led to considerable supplementary ordering. Now that this demand has been taken care of, it is not likely that there will be another increase in orders unless some of the fruit packs prove larger than now estimated.

Business in heavy rolled products has been augmented by the placing of about 25,000 tons of steel for the Chesapeake & Ohio cars and the purchase of part of the 10,000 tons required for the 500 subway cars recently placed by the Board of Transportation, New York.

Bids have been deferred until Aug. 8 on contract No. 45 for the Triborough bridge, New York, covering a depressed roadway in Queens. Approximately 1350 tons of structural steel and 1700 tons of reinforcing bars are required. In about a month figures will be taken on another section of the West Side elevated highway, Manhattan, extending from Forty-eighth Street northward. It is estimated that this section, which is to be built by the city, will call for 10,000 to 15,000 tons of steel.

Mill prices continue to hold, but resale prices, both in the field of fabrication and in warehouse distribution, particularly of pipe, are irregular.

Word from abroad indicates that there is some prospect of a revival of the international pipe cartel. The syndicate broke up when Germany demanded the Saar quota and France refused to give it up. American export prices were not affected by the competitive situation which followed the collapse of the cartel. American export prices for tin plate still average around $4.20 per base box, Pittsburgh. Prices at Pittsburgh have varied considerably since the inauguration of the practice of quoting prices c.i.f. foreign port of delivery.

Pig Iron

All domestic prices are holding firmly, but certain types of foreign iron continue to be offered considerably below published market levels. In most cases, the small amounts of Russian iron stored at nearby points are available with the silicon differentials waived, and a number of smaller foundries have taken advantage of this price concession to secure small trial tonnages. Although there have been very few general inquiries in the market, the volume of miscellaneous buying for quick shipment is holding up comparatively well. Total sales last week amounted to 1650 tons, as compared with 1350 tons in the preceding period and 2550 tons booked in the weekly period a fortnight ago. American Radiator's Tonawanda furnace at Buffalo is scheduled to go into blast on Aug. 1, making foundry and malleable grades.

Reinforcing Steel

Base and delivered prices are holding steady, but some distributers are shading somewhat on service and bending charges, etc. Miscellaneous business is coming out in better volume and indications are that New York and Pennsylvania highway demands will be much heavier by mid-August. Concrete Steel Co. will furnish 550 tons for a highway in Queens, N. Y., and 100 tons for an industrial building in Newark, N. J. Pending projects include 1500 tons for a grade crossing on Staten Island, N. Y., and 110 tons for a road extension and grade elimination in Atlantic County, N. Y.

Scrap

Brokers are slowly liquidating outstanding Japanese commitments. Inasmuch as that country is now overstocked, new business is not expected to mature for at least another month. Italy is definitely anxious for scrap but difficulties regarding payments are holding up the placing of new business. Brokers are buying occasional lots of cast grades, stove plate, turnings and brake shoes for England and other European countries. Brokers' bids for No. 1 and No. 2 steel continue firm at $8.50 and $7.50 a ton respectively for delivery alongside barges. Although these prices are currently firm, the steady decrease in export backlogs may cause some disorganization in prices during the next month unless heavier domestic demand appears to bolster the market. So far, domestic demand continues to lag. Some grades are being shipped to Pittsburgh, but eastern Pennsylvania is now drawing little or no tonnage from this area.

Coast Scrap Exports Show Gain

SAN FRANCISCO, July 22.—An increase of approximately 100 per cent in the exports of iron and steel scrap from the Pacific Coast has been reported during the first six months. The Japanese buyers, having shipped about 150,000 tons from Pacific ports during this period, are largely responsible for the recent slight increase in price and the present firmness.

In the Northwest, the Pacific Coast Steel Corpn. was the low bidder to the Bureau of Reclamation for the lock-operating equipment at Bonneville dam. Involved in the contract are 1480 tons of structural steel and 370 tons of miscellaneous steel. It is believed that an award will be made shortly to Columbia Steel Co. for cranes and the gates for Bonneville spillway dam in which 6000 tons of structural steel and castings are specified.

Bids are to be opened the last of the week at Washington, D. C., for a mint at San Francisco. From present estimates 1000 tons of structural steel and 800 tons of reinforcing bars will be required. Plans are being prepared for the Consolidated Copper Co. for a concentration plant to be constructed at Kimberly, Nev., which will call for 3000 tons of structural steel.

Lettings during the week have been few and for minor tonnages. The cast iron pipe and steel plate markets have been particularly inactive. Prices are holding steady as prospective business looks most encouraging.

Cast Iron Pipe

Ann Arbor, Mich., is inquiring for 250 tons for a sewage treating plant.

Chicago, 1595 tons, bids opened with Glamorgan Pipe & Foundry Co. low bidder on the bulk of the tonnage.

Greenville, S. C., has awarded 600 tons to National Cast Iron Pipe Co.

Hartsville, Tenn., has placed 250 tons with National Cast Iron Pipe Co.

Vernon, Ala., plans pipe lines for water supply. Fund of $63,000 is being arranged through Federal aid for this and other waterworks installation and sewer system.

Butler, Ala., plans water pipe lines. Fund of $29,000 is being arranged for this and other waterworks installation.

Mount Vernon, Ky., has secured fund of $52,700 through Federal aid for pipe lines for water system and other waterworks installation.

Galena, Mo., plans pipe lines for water supply. Fund of $40,000 is being arranged for this and other waterworks installation. G. W. Fletcher, 417 South Robertson Street, Springfield, Mo., is consulting engineer.

Milltown, Ind., closes bids July 31 for pipe for water system, pumping station and other waterworks equipment. Cost about $55,000. Lennox & Matthews, Architects and Builders Building, Indianapolis, are consulting engineers.

Hamden, Ohio, plans pipe lines for water system; also elevated steel tank and tower. Fund of $19,200 has been secured through Federal aid. Burgess & Nipple, 586 East Broad Street, Columbus, Ohio, are consulting engineers.

Sierra Blanca, Tex., plans pipe lines for water supply. Fund of $35,000 is being arranged through Federal aid for this and other waterworks installation.

Savannah, Ga., plans extensions in water pipe lines in Gordonston and neighboring districts. Cost about $25,000. Financing will be arranged through Federal aid.

Belle Glade, Fla., plans pipe lines for water system. Fund of $36,000 has been arranged through Federal aid for this and other waterworks installation.

Houlka, Miss., plans pipe lines for water system. Fund of $18,000 has been arranged through Federal aid for this and other waterworks installation. R. M. Striger, Tupelo, Miss., is consulting engineer.

Hastings State Hospital, Hastings, Neb., has surveys under way for high pressure pipe lines for fire protection. Appropriation of $14,000 has been approved by State. L. D. Hart, Lincoln, Neb., State engineer, is in charge.

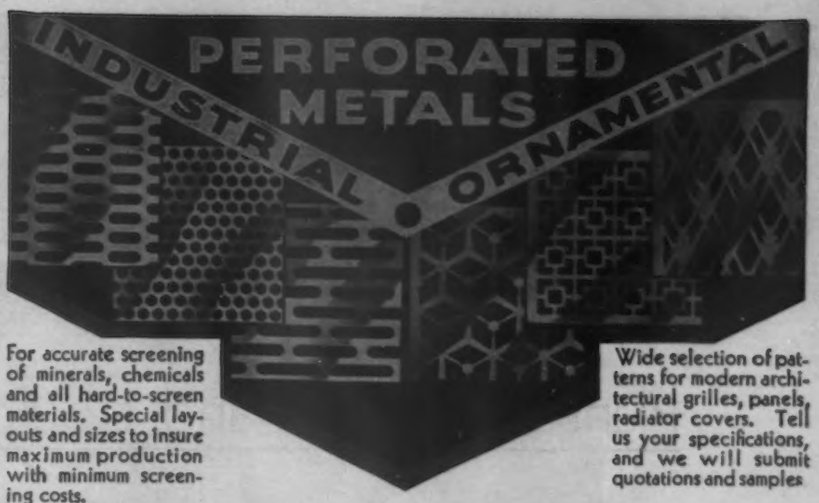
Stevensville, Mont., is arranging special election to vote bonds for $30,000 for pipe lines for water supply and other waterworks installation.

Vancouver Water District, Vancouver, B. C., plans about three miles of 60-in. for main trunk line water supply, replacing present wood pipe. Bids will be asked early in fall. Cost about $275,000. E. A. Cleveland, 500 Beatty Street, is engineer for district.

Elk City, Okla., has secured fund of $157,000 through PWA and will arrange financing for remainder of required appropriation of $350,000 for main pipe lines for trunk water system, extensions in distribution pipe lines and other waterworks installation. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

San Mateo, Cal., has awarded 206 tons to American Cast Iron Pipe Co. through a contractor's letting.

Prairie City, Ore., has let general contract on water system improvements involving 102 tons to be placed by contractor.



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Main Bearing Pads on Packard Motor Block

(CONTINUED FROM PAGE 33)

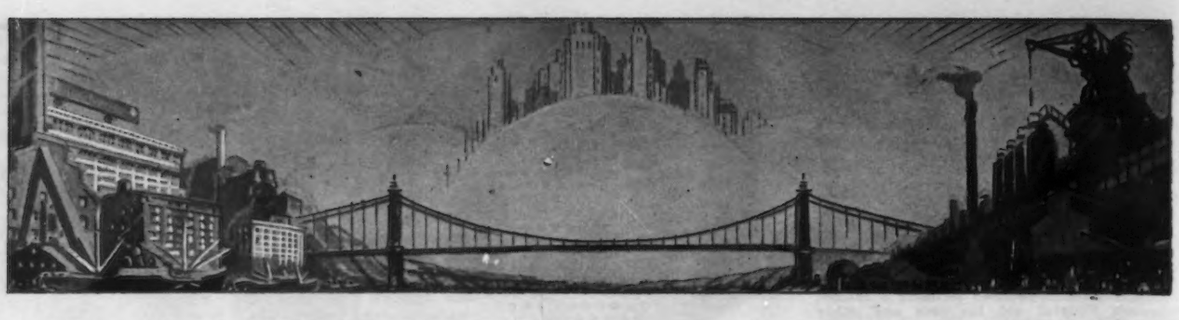
ing force of 48,500 lb. The broaching and return speeds are adjustable at the machine control handle. The maximum broaching speed is 24 ft. per min., and the return speed, 60 ft. per min. or better. The machine is 26 ft. long, 28 in. wide, 67 in. high, and weighs 32,100 lb., net. It is operated by a 20-hp. motor. The sectional broaching tools are mounted in the upper crosshead.

Assembling Presses Installed

For assembling camshaft bushings in the cylinder block a 20-ton horizontal assembling press has been installed. Bushings first are assembled on the fixture bar with pressing-in collars. The bar with the bushings then is pushed into the block and located, the block being on a roller conveyor. The block is rolled on to the machine where it is easily handled with fixture rollers and all the bushings are assembled at one time. The assembly pressure is adjustable and may be read conveniently on the direct-reading gage provided. The machine is of welded steel, with the pump and direct - drive motor mounted in the base so as to conserve floor space.

A 25-ton press is used to assemble all the valve stem guide bushings simultaneously. A removable fixture is employed on the motor block so as to locate the bushing. The operator's work is confined to assembling the bushings in the fixture, pushing the block off the conveyor into the machine and operating the press for the assembly job. The guided cross-head moves down against a positive stop for the correct assembly of the bushings. The fixture is arranged so that for unloading purposes the operator can tilt it with a foot lever and slide the block back on to the conveyor. As in the case of the camshaft bushing assembly press, this press is constructed of welded steel, with the pump and direct-driven motor installed in the base. The assembly pressure is adjustable, and is indicated on a direct-reading gage.

The fifth annual economic conference for engineers sponsored by the Stevens Institute of Technology, Hoboken, N. J., will be held at the Stevens Engineering Camp, Johnsonburg, N. J., Aug. 10 to 17. "Taxation and the Cost of Government" will be the general theme of the conference, which will be featured by lectures and seminars each morning and evening.



Plant Expansion and Equipment Buying

Regional Variations In Tool Activity

ACTIVITY, in machine tool centers, is more evenly distributed this week than are new orders. The Cincinnati district is the current high spot for the latter, bookings for all types of tools, with the exception of the heaviest machines, continuing to equal those of last week. Automobile makers, particularly Ford and Chevrolet, have placed orders for lathes, millers, grinders and drilling machines.

Some difficulty in obtaining castings is now being experienced and is adding to the manufacturing problems. Foundries, which have been down for long periods, have lost many experienced men and these cannot be replaced sufficiently fast to cope with casting needs. Shortage of skilled machinists is also continuing.

◀ NORTH ATLANTIC ▶

American Distilling Co., 135 East Forty-second Street, New York, an interest of American Commercial Alcohol Corpn., 405 Lexington Avenue, plans new distillery near city limits at Staurton, Va., with power house, machine shop and other mechanical departments. Cost close to $350,000 with machinery.

Willor Mfg. Corpn., 117 Mercer Street, New York, manufacturer of metal specialties, has leased space in building at 72-78 Spring Street for new plant.

Peter Doelger Brewing Corpn., 501 West 125th Street, New York, plans modernizing and improving former plant of Hauck Brewing Co., Kingston, N. Y., recently leased for branch plant, including installation of new equipment. Cost over $50,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 2 for copper nickel alloy tubes for Brooklyn, Philadelphia and Charleston Navy Yards (Schedule 5628); for 60,000 ft. of acetylene and hydrogen gas hose and 60,000 ft. of oxygen gas hose for Brooklyn Navy Yard (Schedule 5626).

Construction Quartermaster, United States Military Academy, West Point, N. Y., plans new equipment storage and distributing building. Cost about $100,000 with equipment.

Signal Supply Officer, Army Base, Brooklyn, asks bids until July 29 for one self-supporting steel tower, 125 ft. long (Circular 2); until Aug. 7, radio transmitting and receiving equipment (Circular 1).

American Standard Watch Co., 580 Fifth Avenue, New York, a subsidiary of Bulova Watch Co., same address, with plants at Woodside, L. I., Providence, R. I., and Waltham, Mass., has leased a floor in building at 50 Journal Square, Jersey City, N. J., for new watch movement assembling works.

Colonial Beacon Oil Co., 30 Rockefeller Plaza, New York, a subsidiary of Standard Oil Co. of New Jersey, has let general contract to T. C. Brown, Inc., 307 Union Street, Schenectady, N. Y., for new bulk oil storage and distributing plant at Niskayuna, near Schenectady. Cost about $80,000 with steel tanks, pumping machinery and other equipment.

United States Engineer Office, First District, New York, asks bids until July 29 for one complete galvanized steel building, 14 x 20 ft., with swing door and auxiliary equipment (Circular 17).

Board of Education, 417 South Broad Street, Elizabeth, N. J., plans new three-story vocational school at Williams Field, with group of 16 shop units for boys, including machine, automotive, electrical and other departments. Cost over $500,000 with equipment. An addition is also planned to Grover Cleveland junior high school, to include eight vocational training shops. Financing is being arranged through Federal aid.

Quartermaster Depot, Twenty-first and Johnston Streets, Philadelphia, asks bids until Aug. 5 for one cloth rolling and measuring machine (Circular 12); until Aug. 6 for 100 four-steel wheel warehouse trailers (Circular 14).

Palmyra School District, Palmyra, Pa., plans manual training department in new two-story junior-senior high school. Special election has been called July 30 to vote bonds for $250,000 for structure and equipment. Gondos & Gondos, Architects' Building, Philadelphia, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 30 for eight 1000-lb. platform scales, and 18 240-lb. counter scales, for Philadelphia, Boston and Great Lakes navy yards (Schedule 5587); until Aug. 2, 450 fuel quantity gages (Schedule 5590) and 400 aircraft engine gage units (Schedule 5591), for Philadelphia Navy Yard.

◀ NEW ENGLAND ▶

Landers, Frary & Clark, New Britain, Conn., manufacturer of electrical heating and cooking appliances, cutlery, etc., has let general contract to Torrington Building Co., Torrington, Conn., for one story addition, 100 x 120 ft. Cost over $50,000 with equipment. W. F. Brooks, Lewis and Gold Streets, Hartford, Conn., is architect.

Construction Quartermaster, Springfield Armory, Springfield, Mass., plans extensions and improvements in shops, storehouses, warehouses and other buildings, to cost $242,500 with equipment; also will expand and modernize electric light and power systems, water supply and other utilities, at cost of $35,100. Appropriation is being arranged.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 6 for 1500 electric tractor steel leg platforms for Boston Navy Yard (Schedule 5624).

◀ BUFFALO DISTRICT ▶

Scintilla Magneto Co., Sherman Avenue, Sidney, N. Y., a unit of Bendix Aviation Corpn., 105 West Adams Street, Chicago, has acquired Hurley-Townsend Corpn., 305 East Forty-fifth Street, New York, manufacturer of ignition equipment, spark plugs, etc., and will consolidate, concentrating operations at Sidney where work will soon begin on one-story addition to cost about $50,000 with equipment. General contract for unit has been let to Austin Co., Cleveland.

Willys-Morrow Co., Elmira, N. Y., manufacturer of automotive equipment, a subsidiary of Willys-Overland Co., Toledo, Ohio, now in receivership, is arranging for sale of its plant and equipment to Elmira Industries, Inc., Elmira, for $250,000.

◀ WESTERN PA. DIST. ▶

Gulf Oil Corpn., Seventh and Grant Streets, Pittsburgh, has approved plans for new bulk oil storage and distributing plant at Sanford, Fla. Cost about $85,000 with steel tanks and other equipment.

Aluminum Cooking Utensil Co., New Kensington, Pa., has approved plans for six-story addition. Four floors of new unit will be used for general production and other two for storage and distribution. Cost about $225,000 with equipment.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, plans one-story factory

he dictates Wire Specifications

for Every wire rope has Grave Responsibilities!

The man in charge of a rope may not know how wire is made but he is quick to note danger signals such as the breaking of wires or undue rope elongation. He sees when the rope must be changed . . . if its service life is too short he protests . . . he therefore dictates wire specifications. The vast tonnage of Wissco Wire used in wire rope making is proof of its strength, toughness and uniformity. You, too, may dictate as to the specifications of Wissco Wire for your specific purposes. You too will find the Wissco Wire made to your dictates to be exactly the wire that suits your needs.

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There is hardly a wire rope in use the failure of which would not result in the loss of life or property.

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by Wickwire Spencer

Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Machinery Spring Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

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AND
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CLEVELAND CHICAGO PHILADELPHIA

branch, storage and distributing plant, 160 x 275 ft., at High Point, N. C., where site has been acquired. Cost over $80,000 with equipment.

Peter F. Loftus, Oliver Building, Pittsburgh, consulting engineer, asks bids until Aug. 1 for equipment for extensions and improvements in municipal electric light and power plant at Jamestown, N. Y., including two high-pressure watertube boilers and accessories, mechanical stokers, fuel economizers, draft equipment, etc. Cost over $70,000.

SOUTH ATLANTIC

Southeastern Brewing Co., 106 Washington Street Viaduct, S. E., Atlanta, Ga., operating a plant at Chattanooga, Tenn., plans expansion and improvements, including additional equipment. Cost over $80,000 with machinery.

Washington Coca Cola Bottling Works, Inc., Washington, Ga., has plans for new two-story mechanical bottling plant. Cost over $45,000 with equipment. Francis P. Smith, Norris Building, is architect.

Port Authority, Savannah, Ga., has plans for new municipal abattoir and cold storage and refrigerating plant. Cost about $250,000 with equipment. Financing is being arranged through Federal aid. Menges-Mange, Inc., 1515 North Grand Street, St. Louis, is consulting engineer.

Board of Works, Daytona Beach, Fla., plans early call for bids for two 300,000-gal. elevated steel tanks and towers, motor-driven pumping machinery and accessories, water-softening plant with capacity of 4,000,000-gal. per day, and other equipment for municipal waterworks. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is consulting engineer.

SOUTH CENTRAL

Henry Fischer Packing Co., 1862 Mellwood Street, Louisville, meat packer, has plans for extensions and improvements in steam power house, including boiler and accessories, fuel-burning equipment, etc. Cost close to $25,000 with equipment. A. M. Kinney, Inc., Carew Tower, Cincinnati, is consulting engineer.

Board of Education, Nashville, Tenn., plans manual training department in new three-story senior high school for Negroes at Johnston Avenue and Seventeenth Street. Cost close to $200,000 with equipment. McKissick & McKissick, Morris Memorial Building, Nashville, are architects.

Champion Pneumatic Tool Co., Chattanooga, Tenn., has been organized by R. S. Casey and Albert W. Taber, Chattanooga Bank Building, capital $100,000, to manufacture pneumatic drills and other kindred tools and parts.

Kentucky Utilities Co., Somerset, Ky., plans new power transmission line from Somerset to Williamsburg, Ky., with substation and service facilities at latter place. Cost over $250,000 with equipment.

Construction Quartermaster, New Orleans, plans new quartermaster depot, with shops, equipment buildings and other structures. Appropriation of $430,000 is being arranged.

OHIO AND INDIANA

Penn-Maryland Corpn., 7818 Anthony Wayne Avenue, Carthage, Ohio, distiller, with headquarters at 120 Broadway, New York, has let general contract to Frank Messer & Sons, Inc., 2515 Burnet Avenue, Cincinnati, for new seven-story storage and distributing plant. Cost close to $200,000 with equipment.

E. W. Ferry Screw Products Co., Cleveland, recently organized by E. W. Ferry, formerly vice-president and treasurer of Ferry Cap & Set Screw Co., has taken over one-story building at 8219 Almira Avenue, S. W., for manufacture of cap and set screws, nuts, connecting rods and kindred engineering specialties. Mr. Ferry will be president of new company, and Ray F. Vixler, previously connected with Ferry Cap & Set Screw Co., factory manager.

Board of Public Affairs, Greenfield, Ohio, has authorized plans for addition to municipal electric light and power plant, including new equipment. Cost close to $30,000. Walter I. Barrows, Reibold Building, Dayton, Ohio, is consulting engineer.

Dominion Electrical Mfg. Co., Mansfield, Ohio, has been organized by Benjamin Shaffer and Nathan Lifson, care of Henkel & Gongwer, 408 Farmers' Bank Building, representatives, capital $300,000, to manufacture electrical products.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until July 29 for electric soldering copper (Circular 12); 30 controllable hollow steel propeller blades (Circular 9); until July 30, airplane anchor mooring rods and airplane anchor driving rods (Circular 22); until July 31, 50 landing gear wheel brake assemblies (Circular 17); until Aug. 1, one set carriages for dynamic testing jig wheel, including forks and axles (Circular 27); until Aug. 2, one universal testing machine (Circular 7); until Aug. 6, antenna supports and mast assemblies (Circular 16).

United States Engineer Office, Zanesville, Ohio, asks bids until July 30 for 12 service gates, one emergency gate and two gate hoists, with accessories, for four dams (Circular 3).

East Dayton Tool & Die Co., 310 East Second Street, Dayton, Ohio, manufacturer of tools, dies and kindred mechanical products, has asked bids on general contract for one-story plant on property recently acquired at Evansville, Ind. Cost close to $35,000 with equipment. William Schleman is general manager.

MICHIGAN DISTRICT

Plymouth Motor Corpn., Mount Elliott Avenue and Lynch Road, Detroit, plans four one-story additions, totaling about 104,000 sq. ft. floor space, part of area to be used for general production and remainder for storage and distribution. Cost over $650,000 with equipment. Company is a subsidiary of Chrysler Corpn.

Monroe Steel Castings Co., Monroe, Mich., has let general contract to Bennage & McKinstrie, Monroe, for one-story foundry addition. Cost over $25,000 with equipment.

Royal Oak Tool & Machine Co., 621 East Fourth Street, Royal Oak, Detroit, manufacturer of machinery and parts, tools, etc., plans rebuilding part of plant recently destroyed by fire. Loss over $60,000 with equipment.

Board of Education, Jackson, Mich., plans new power house for school service. Cost about $25,000 with equipment. Kresbach & Frost, Jackson, are architects.

Board of Public Works, Grand Rapids, Mich., has plans for new municipal service, repair and garage building, and equipment storage and distributing unit. Cost about $225,000 with equipment. Financing is being arranged through Federal aid.

MIDDLE WEST

Armour & Co., Union Stock Yards, Chicago, meat packers, have let general contract to Service Construction Co., Allisonville Park, Indianapolis, for one-story top addition to branch plant at Indianapolis, 66 x 95 ft. Cost about $45,000 with equipment.

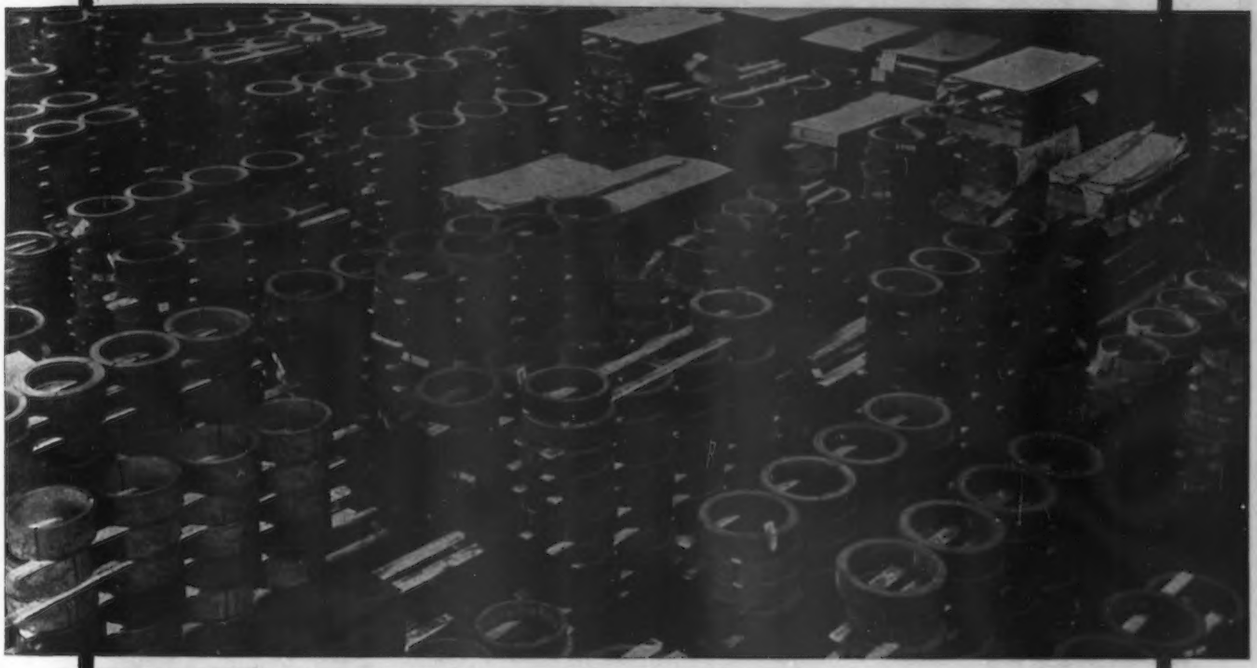
Excel Electric Co., 1923 West Twenty-third Street, Chicago, manufacturer of electrical equipment, has awarded general contract to F. Sedlak, Jr., 1529 Sixtieth Court, for new one-story plant, 74 x 92 ft. Cost about $30,000 with equipment. H. H. Stoddard, 411 Cuyler Avenue, is architect.

City Council, Rock Rapids, Iowa, is arranging financing through Federal aid in amount of $95,000 for new municipal electric light and power plant and electrical distribution system. Entire project will cost about $200,000 and bonds will be issued in that sum. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

State Department of Administration and Finance, State Capitol, St. Paul, Minn., Carl R. Erickson, purchasing agent, has authorized plans for addition to power plant at institution at Wilmar, Minn., including installation of new equipment. Cost about $45,000 with equipment. P. C. Bettenburg, Metropolitan Life Building, is architect and G. M. Orr & Co., Baker Building, consulting engineers, both Minneapolis, Minn.

Coal Processing Corpn., an interest of Old Ben Coal Corpn., 232 South Clark Street, Chicago, has plans for new fuel briquet manufacturing plant at Superior, Wis., including processing building, dryer house, pressing building, tank car unit

THERE ARE DOLLAR-SAVINGS IN THESE ARMCO COILS



Here is a veritable ocean of top-quality coils—all destined to cut stamping costs for Armco's customers.

You, too, can share in these desirable cost-savings, either by sending in your specifications for automatic press stampings, or by calling in an Armco Man experienced in solving unusual problems.

For one thing, you'll reduce scrap losses through continuous operations. One operator can easily handle several presses. And you don't need a big warehouse either; for Armco Hot and Cold-Rolled Coils are compact and conserve your valuable storage space.

Armco Coils, like Armco Sheets, are processed to order with the necessary temper, finish and drawing properties. Yet the big feature to remember is that the yield is high, even when the draw is severe on automatic fast-action presses.

You can order Armco Hot and Cold-Rolled Coils in any width from 1½" to 38", in a wide range of gages. Shall we talk over your coil requirements? Just communicate with The American Rolling Mill Company, Executive Offices, 703 Curtis St., Middletown, Ohio.

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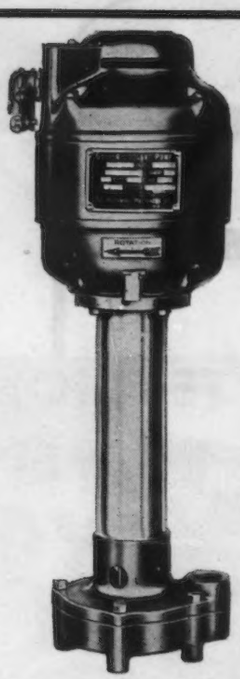

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COOLANT PUMPS-

Will give you trouble-free service indefinitely because friction is minimized to the vanishing point. There being no metal to metal contacts within the Pump, non-lubricating liquids, grinding and lapping compounds can be handled safely and dependably. They are constructed of one piece castings with flanged mountings to retain absolute alignment.

Write for prices.

THE RUTHMAN MACHINERY CO.
Cincinnati, Ohio

and machine shop. Cost over $85,000 with equipment.

Board of Vocational Education, Antigo, Wis., has applied for Federal loan of $108,700 for additions to vocational school designed by Law, Law & Potter, architects, 1 Pinckney Street, Madison, Wis. Orvel Olsen is director of school.

Rundle Mfg. Co., 3305 West Forest Home Avenue, Milwaukee, manufacturer of plumbers' enameled sanitary ware and brass goods, has started work on plant extension, 43 x 50 ft.

Board of Vocational Education, Appleton, Wis., Carlton Saecker, president, has plans by W. Fred Dolke, Jr., architect, Evanston, Ill., for addition to vocational school, 71 x 125 ft., to house machine, electrical and woodworking shops. Herbert Heilig is director.

Scherff Machine Co., 2738 South Twenty-ninth Street, Milwaukee, has taken over a factory building at 2620 South Fifth Street for enlarging production.

SOUTHWEST

Ash Grove Lime & Cement Co., Fairfax Building, Kansas City, Mo., has approved plans for new two-story machine shop at branch plant at Galloway, Mo. Cost over $25,000 with equipment.

Board of Education, Library Building, Kansas City, Mo., George Tinker, secretary, is arranging financing through Federal aid for three-story and basement mechanical shop at Twenty-second and Charlotte Streets. Cost $135,000 with equipment. Charles A. Smith and Nate W. Downes, Finance Building, are architect and mechanical engineer respectively.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., plans new power transmission line to Subiaco, Ark., and vicinity, with substation and distribution facilities at latter place. Cost over $50,000 with equipment.

Board of Education, El Dorado, Kan., plans manual training equipment in three-story and basement high school, for which financing in amount of $400,000 is being arranged through Federal aid. Thomas W. Williamson & Co., National Bank of Topeka Building, Topeka, Kan., are architects.

Pettus Oil & Refining Co., Pettus, Tex., care of Morris Roberts, Pettus, head, plans new oil refinery near Mathis, Tex. Storage and distributing division will be installed, with steel tanks and auxiliary equipment. Entire project will cost over $90,000 with machinery.

Board of Trustees, Rusk State Hospital, Rusk, Tex., plans extensions and improvements in power house, including new 500-hp. boiler unit and auxiliary equipment. Appropriation has been arranged.

South Texas Cotton Oil Co., Waco, Tex., plans rebuilding part of mill recently destroyed by fire. Loss over $50,000 with equipment.

Universal Mills, Fort Worth, Tex., plans rebuilding feed milling plant destroyed by fire July 6. Loss close to $250,000 with equipment.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Aug. 1 for one boiler for locomotive crane (Circular 2).

Virginia Fruit Brandy Distilling Corpn., North Garden, Va., care of E. C. Knight, Rural Retreat, Va., head, recently organized with capital of $100,000, plans new distilling plant of several one and multi-story units, at North Garden. Cost about $65,000 with machinery.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for motor-driven pumping machinery and accessories, motor controls, piping, etc., for Naval Academy, Annapolis, Md. (Specification 8026).

Continental Baking Co., 10 South Jefferson Street, Richmond, Va., plans one-story addition, part of unit to be used for expansion in baking division. Cost about $50,000 with ovens and other mechanical equipment.

Krebs Pigment & Color Co., Curtis Bay, Baltimore, manufacturer of industrial chemicals, paint pigments, etc., has plans for one-story addition, 46 x 81 ft. Cost about $40,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 31 for one air compressor, eight steel manganese lips, galvanized corrugated roofing, 14,000 galvanized iron straps, galvanized ridge roll, etc. (Schedule 3074); until Aug. 1, galvanized flanged riveted spiral pipe, pipe dies, bolt dies, hand taps, machine screws, wood screws, carpenters' nail hammers, blacksmiths' chisels, machinists' vises, hand shovels, one batching plant, two weighing hoppers and other equipment (Schedule 3073).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 30 for two-motor-driven turret lathes and equipment (Schedule 5612), one motor-driven turret lathe and equipment (Schedule 5613), metal-cutting hack saw (Schedule 5614), for Norfolk, Va., Navy Yard; steel bolts and nuts and lag screws (Schedule 5558), electric cable, cord and wire (Schedule 5563); until Aug. 2, machine screws and nuts and wood screws (Schedule 5567), for Eastern and Western yards; until July 30, 27,000 lb. copper-nickel-alloy cylinder forgings (Schedule 5600), for Washington yard.

PACIFIC COAST

Italian Swiss Colony, 871 Beach Street, San Francisco, operating a winery, has awarded general contract to Cahill Brothers, 206 Sansome Street, for new one-story plant at Asti (Sonoma County), for storage and distribution. Cost about $65,000 with equipment.

Oxnard Citrus Association, Oxnard, Cal., has let general contract to A. Schroeder, 300 G Street, Oxnard, for one-story citrus fruit-packing plant at Hueneme, Cal., totaling about 100,000 sq. ft. floor space. Cost close to $200,000 with packing, conveying, loading and other mechanical equipment. E. A. Hooker is manager.

Consolidated Wagon & Machine Co., 736 South West Third Street, Salt Lake City, Utah, mechanical equipment, tractors, etc., plans rebuilding part of storage and distributing plant recently destroyed by fire. Loss over $100,000 including equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 6 for one motor-driven turret lathe and equipment (Schedule 5613), one motor-driven cross sliding head-type turret lathe and accessories (Schedule 5615), for Puget Sound Navy Yard.

Portland Wire & Iron Works, 464 S. E. Seventeenth Street, Portland, has let general contract to T. H. Banfield, 1735 S. W. Prospect Street, for extensions and improvements in storage and distributing plant. Cost close to $25,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Aug. 8 for one or two 23,000-volt oil circuit breakers, one reactor assembly with disconnecting switch, lightning arresters, capacitors and accessory equipment for Boulder Dam power plant, Boulder Canyon Project, California-Arizona-Nevada (Specifications 701-D).

Board of Education, Santa Monica, Cal., plans vocational training department in new high school. Cost over $350,000 with equipment. Marsh, Smith & Powell, 816 West Fifth Street, Los Angeles, are architects.

FOREIGN

British-Bellanca Aircraft Co., Ltd., London, England, is being organized by officials of Bellanca Aircraft Corpn., Bellanca Field, New Castle, Del., with capital of £400,000 (about $2,000,000) to erect new plant at Speke, near Liverpool, England, for manufacture of commercial and military aircraft, with units for parts production and assembling. Cost close to $500,000 with equipment.

Secretary, Supplies and Tenders Board, Wellington, New Zealand, will receive bids until Sept. 17 for five low-lift-pumping units, with priming equipment, control apparatus, etc.; two 13,000 gal. per min. pumping units with accessories; three similar pumping units, 3000, 2500 and 2000-gal. per min. respectively, with auxiliary equipment, all motor driven; until Oct. 8, one 1500 kva. electrical transformer with accessories.

T. W. Ward, Ltd., Albion Works, Sheffield, England, manufacturer of iron and steel products, engineering specialties, etc., has secured approval of bid of $81,276 for machinery at plant of Gears & Forgings, Inc., Ford City, Pa. It will be removed to Sheffield and used in part for expansion of Albion Works noted.

Condor Compensated
PATENTED
TRADE MARK REGISTERED

BELT — FOR MAIN DRIVES

THE LOW TENSION RUBBER BELT

with equalized ply stresses

For the heavy duty of the main drive, specify Condor Compensated Belt. The 28" 9-ply Condor Compensated Belt in the illustration is one more demonstration of the safety, economy, and efficiency of this exceptional belt which, due to its scientific construction, is not overstrained by the pulley flexing.

Condor Compensated Belt is made to conform to the curvature of the pulley; each ply bearing an equal load when bent. The pulley surface has been engineered for low tension operation. Try it and be convinced.

Write for New General Catalog

ADVANTAGES:

1. Ruptures in outside ply practically eliminated
2. Ply separation practically eliminated
3. Longer fastener life
4. Operation less affected by atmospheric conditions
5. Less bearing, shafting, and hanger troubles
6. High efficiency
7. Higher overload capacity or margin of safety
8. Less wear on pulley side
9. Can be operated on smaller pulleys
10. For heavy loads, plies may be increased with same pulleys
11. Can be dressed without destructive effect
12. Material reduction in belting costs.

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Transmission Belt
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Air Hose
Contractors Hose
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Fire Hose
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A SERIES of Six Folders is being published picturing numerous applications of Cleveland Tramrail—also giving facts and engineering reasons why over 3500 customers have purchased 15000 Installations of Cleveland Tramrail.

● The first two of these folders have been mailed to 25000 prospective users of Cleveland Tramrail. If YOUR name is not on our list, notify our district representative in your territory or our Home Office—we will add it, and send you back copies of the folders.

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CLEVELAND TRAMRAIL

Hand or Electric
Overhead Materials
Transportation Equipment

DIVISION OF
THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE OHIO

Use of Bronze as a Forming and Drawing Die Material

(CONTINUED FROM PAGE 23)

Metal are quite brittle, elongation being but a few per cent. Therefore, either the die sections are made considerably heavier, or the dies are firmly backed up with steel. In the case of exceptionally large or heavy dies, such as are used for the forming of automobile frames, steel backings are frequently faced with these bronze segments, machined, fitted into place, and held in place by set-screws tapped into the under side of the segments. Lubricants and press speeds are the same as for steel dies, but due to the anti-friction characteristic of the metal, blank holder tension is necessarily increased to prevent wrinkling or corrugating. An additional advantage of copper-base dies is in the better heat transference of bronze. In drawing dies, especially, localized heat will sometimes seriously alter the clearance between punch and die. This localized heat is quickly dispersed by bronze, and clearances remain more constant.

Ampco Metal dies are not recommended for all work. For obvious reasons, they do not serve for drawing copper, brass or bronze. Neither are they recommended for wire drawing dies or for service with unpickled sheet because of the severe abrasive action encountered. Because of the fact that hardened steel holds an edge much better than a copper-base alloy, Ampco Metal does not serve for blanking or pinch draw dies. And because of the shock action, and temperatures encountered in forging work, steel serves better for forging dies.

Evolution of Steel-Shapes Processing

(CONTINUED FROM PAGE 20)

to 10,000 lb. per sq. in. pressure capacity. Effective working pressure averages 5900 lb. per sq. in.

Operating Equipment

Proposed machines, as were those experimentally used, are of double-end design, giving both direct and indirect action in the extruding operation. Shock or recoil from the shot-stroke is absorbed by secondary compression of the air in the air system. The action is just the reverse of the "shot" action for the recoil pressure is against the water which "kicks back" against the

ELWELL-PARKER *Customers:*

WHAT'S THE NET OF ALL THIS TALK ABOUT MATERIAL-HANDLING *Savings?*

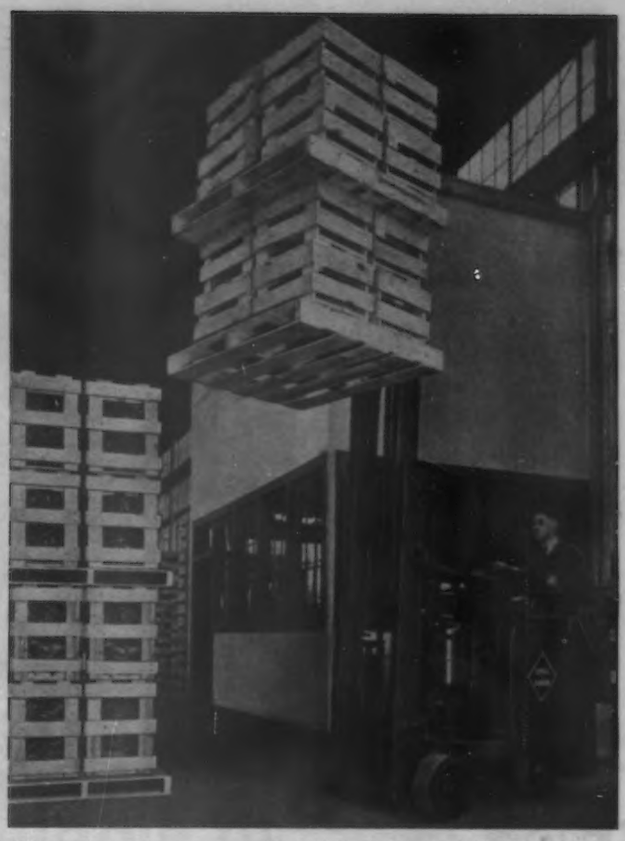
IT isn't enough to *read* about new ways to capture more profits through modern methods of handling industrial loads. To *really* make money, you must *actually apply* these methods.

You have the advantage now, because you already own Elwell-Parker Power Industrial Trucks. *Keep* your advantage! Keep production costs down, by handling bigger, heavier loads per trip—transporting them faster, at steady net savings that even more quickly amortize the investment.

If your Trucks are *not* of newest design—hence possibly not the greatest money-makers—better get prices on latest models of Elwell-Parker Fork Trucks. Then move loads all over plant and warehouse, in Boxes, Barrels, Bags or Bales, on light, inexpensive wooden pallets.

Pick up, carry, tier high, take down, deliver to boxcar or motor truck: always in big loads, always on pallets, keeping each load on its pallet, through to destination. Your costs *must* come down, as these data from various industries will prove:

1. **Bundled Tinplate.** More than 713,000 lbs. (328 bundles) with one Truck in 6 hours. Length of haul, 112 feet average.
2. **Chain and Malleable Castings.** "An ounce to 400 lbs. per trip" as one large user notes. Trucks operate all day and often overtime and "have given exceptionally good service."
3. **Stoker Assembly.** One Elwell-Parker handles all plant transportation; serves machine shop, assembly floor, stock room, clearing room, foundry. Travels into foundry yard to dump sand; delivers castings up a long ramp raising 5 ft. in 80.
4. **Heavy Baled Merchandise.** 7200 lbs. payload per average trip of 500 feet. 550 tons in 4½ hours. Three Elwell-Parker Trucks, 4 men. Labor cost, $9.90. To handle same loads in equal time by former method would have cost owner $243.00.
5. **Lumber.** More than 400,000 feet handled in 6 hours with 1 Elwell-Parker, averaging 1300 board feet per load.



"As loads go up, costs come down". Separately-crated electric motors, tiered high by Elwell-Parker Fork Truck. Eight Motors per trip handled with greatest ease on two pallets. Higher tiering provides wider aisles, or permits storing larger stocks to floor load limit.

Conditions in your own plant doubtless are simpler than in scores of others where Elwell-Parker Engineers are constantly demonstrating sharp cost-cutting through modernized methods of handling.

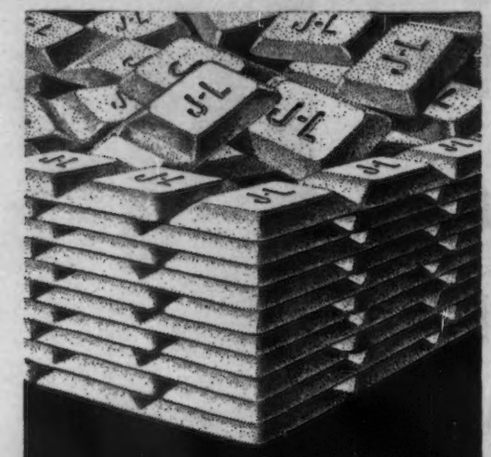
Have you called in trained Elwell-Parker Engineers for a survey and recommendations recently? You *should*—it's part of our no-obligation service to customers.

"This New Industrial Pick-up," a 32-page booklet, is brimful of helpful ideas—gladly sent *other* Executives upon request. The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland, Ohio.

New ELWELL·PARKER *Fork trucks*

ESTABLISHED 1893 • BUILDING INDUSTRIAL POWER TRUCKS SINCE 1906

Foundry
and malleable
pig iron, made
with ore only



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J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

confined air. The kick is received with a cushioning effect.

Four water bottles, 2 ft. 6 in. x 9 ft. inside, at each end of the press, two in tandem, and four air bottles, 4 ft. x 28 ft. inside, two at each end, are employed in the power system for extrusion movement at 6500 lb. working pressure. For the piercing movement, at 6500 lb. working pressure, one each water, 2 ft. 6 in. x 8 ft., and air bottle, 4 ft. x 25 ft., are employed. This makes a total of six work power bottles at each end. These are vertically positioned. The auxiliary bottle-power consists of two water, 18 in. x 10 ft., and one air bottle, 2 ft. 6 in. x 20 ft., inside, having 1200 lb. working pressure. These return the rams to position after the shot-stroke. This entire system is pipe-connected at tops of bottles.

Pressure release for the stroke is by electrically controlled valves of four-station type. The water bottles are automatically "cut-in" or "cut-out" as additional or less pressure is required for the work in hand. All main and auxiliary valves are electrically operated with push-button switches in a remote control hook-up.

Specifications

In this 14,000-ton press the four extrusion cylinders are 56-in. diameter and have a 36-in. stroke. (The extrusion stroke is 72-in. compound movement.) The piercing cylinder is 40-in. diameter and has a 66-in. stroke. Extrusion speeds range from 18 to 72 in. per sec., depending upon the proportionate reduction in cross-section area. Estimated approximate production is 120 to 180 tons per hr., 12-in. tubes, 14-in. rounds, squares, and other equivalent shapes such as rods, rails, slabs or structural shapes.

Machine size, 22½ ft. wide x 16½ ft. high x 46 ft. long. Total floor space for machine and bottles, 24 ft. x 75 ft. Pump space, 16 ft. x 30 ft.

The elements here outlined represent only the rudiments of the power and speed developments by Mr. Sparks and his associates here in the United States.

Patents have very recently been granted on major improvements over the equipment which has so far been built and operated. The important saving which lies in the elimination of intermediate processes in steel-shapes production is the basis for this and other concentrations of design ingenuity. This ingenuity is typical of our industrial resourcefulness in the ever-present necessity for cost reductions.

New Methods of Inspection

(CONTINUED FROM PAGE 21)

bonus group, which must show a profit to the management.

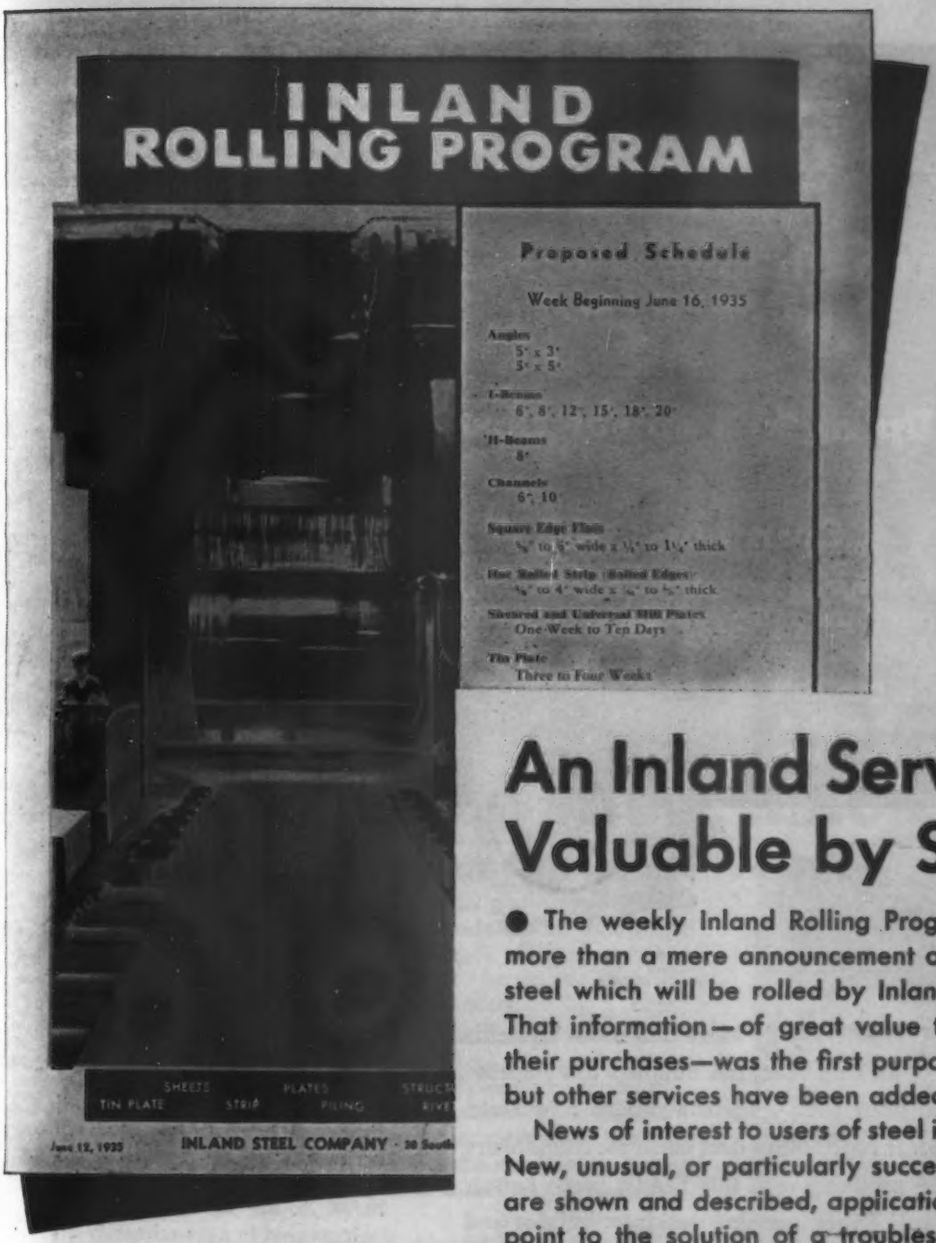
The inspection equipment includes an interesting application of the Chronolog, which is designed primarily for counting and recording the output of a production machine, but which in this case is connected to the gage used in making the last inspection. The Chronolog shows visually at any time the number of pieces that have been produced and inspected. Any member of the group may by a glance at the face of the Chronolog learn at any time during the day the number of pieces that are being machined and the number of rejects, and in addition the device makes a permanent running record in printed form, which goes to the management and production departments and shows executives in these departments how the job is getting along.

Two Production Lines

The housings are aluminum die castings which must be machined to close limits. The operations include the finishing of the bearing surfaces and making a hole for the shaft bushing.

There are two production lines, one for the front and the other for the rear housing and two inspectors for each line.

Dimensional inspections, which are made with five gages, include the checking of a supporting shoulder on one side and then on the other for diameter, proper location of the hub face, the internal diameter of the hole, the runout of each supporting flange and the thickness of the piece. There is practically no duplication of inspection. However, the last gage which inspects



An Inland Service Voted Valuable by Steel Users

● The weekly Inland Rolling Program has come to be far more than a mere announcement of the sizes and shapes of steel which will be rolled by Inland Mills the coming week. That information—of great value to customers in planning their purchases—was the first purpose of the Inland Program, but other services have been added.

News of interest to users of steel is frequently incorporated. New, unusual, or particularly successful applications of steel are shown and described, applications which very frequently point to the solution of a troublesome problem. A running picture of Inland's facilities, products, and service is also given.

Carload buyers of such material as Inland produces will find good use for the Rolling Program. Secure this helpful, weekly publication by mailing the coupon below. No obligation of any nature.

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Sheets Strip Tin Plate Plates Structurals Piling Rails Track Accessories Bars Rivets Billets

INLAND STEEL CO., 38 S. Dearborn St., Chicago Please send me the Inland Rolling Program each week.

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Company City State

• *Shown below, at right:* New Oilgear Fluid Power Feed. Note flanged mounting, as integral machine part . . . Inside pump, eliminating hazard and improving appearanco . . . Self-contained; auxiliary valves and tubing are integral with pump . . . Many other exclusive features.

NEW FLUID POWER FEEDS

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100 to 600% More
Rapid Traverse Speed

•

Up to 50% Lower Cost

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Compensated
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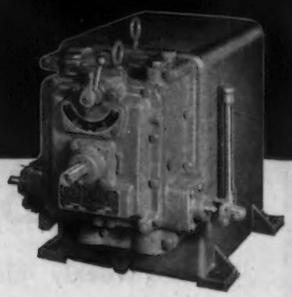

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OILGEAR FLUID POWER FEEDS

[B-3501]

the runout of finished surfaces on each side of the piece and to which the Chronolog switch lever is connected also inspects several other dimensions simultaneously and serves as a check on previous inspections of the size of the hole and thickness of the piece.

"Go" and "No Go" Gages Replace Snap Gages

Snap gages were used when this inspection job was started. These have been replaced by "go" and "no go" gages attached to the inspection bench for maximum convenience in handling pieces, and the girl inspectors, instead of using one hand to hold the snap gages and the other the work, have both hands free to handle the pieces to and from the gages. With the gages affixed to the bench the inspectors have increased their speed to such an extent that four times as many pieces are inspected by the same number of inspectors as formerly with the old inspection methods.

Castings flow rapidly along the machine line to the end of the inspection bench and in a few minutes are given their complete inspection. When the pieces do not pass inspection the defects are discovered almost immediately and the operation is corrected. In this way rejects have been reduced to a negligible quantity. With the group bonus plan not only has every employee an incentive to do his best, but to see that none of his fellow workers lags behind. If one workman gets ahead of others in production and builds up a stock of parts at his machine he moves temporarily to some other machine in the line to speed up work on an operation that is holding back production.

Heat Treating 1000 Different Parts

(CONTINUED FROM PAGE 26)

may have received prior to the heat treatment.

Beryllium copper is so new that all of its properties are not generally known. Its chief advantage is that it can be cold worked into intricate shapes while in the soft annealed state and then hardened by heat treatment. It has a wide range of mechanical properties. In its soft annealed state it has a tensile strength of approximately 70,000 lb. per sq. in. and this can be increased to approximately 200,000 lb. per sq. in. with the proper heat treatment. As to fatigue resistance, endurance limits are greater than 40,000 lb. per sq. in., which contrasts with 25,000 to 27,000 lb. for phosphor bronzes. What this means when used for vibrator arms, motor brushes, spring snap switch blades, etc., can be readily seen.

Cold working hardens beryllium copper, sometimes requiring annealing. The metal must also be annealed after hot working. Holding it at 1470 deg. F. for 15 or 30 min. and then immediately quenching it in water will accomplish this. However, after hot working at a temperature of 1065 to 1425 deg. F., the metal must be annealed or heated for 3 hr. at 1470 deg. F. and then quenched in water

"Do our welders like it?"

"THEY STEAL IT FROM EACH OTHER!"

Several hundred pounds of Murex were ordered for comparative testing by a large Wisconsin plant. When tests were completed the remaining electrodes were distributed among the company's regular welders. Upon investigating to determine how the men liked Murex, the metallurgist found them stealing it from each other.

Even more important, however, than the enthusiastic acceptance of Murex by the welders, were the results of the comparative tests. Greater deposit efficiency was obtained with Murex than with other heavy coated or shielded arc electrodes. The time required for cleaning after welding was reduced 39% when the welds were made with Murex. Needless to say, this plant is now a large and consistent Murex user.

Such an experience is typical. Almost without exception, wherever Murex All-Mineral-Coated Electrodes are given a thorough trial, their speed, efficiency and ease of handling point the way to better welding at lower cost.

May we have an opportunity of proving what Murex can do for you? At your convenience, our nearest branch will gladly arrange a demonstration in your own shop. In the meanwhile, write for a copy of the Murex Booklet.

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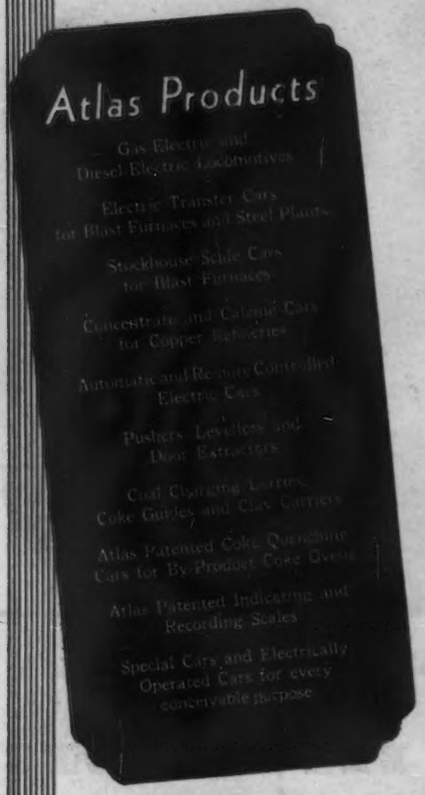
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before it will respond to heat treatment.

Another feature of the tool and die section is an oil quench which is held in a water-jacketed steel tank 3 x 4 x 4 ft. high. Cold water is circulated in pipe coils within the jacket and the work is handled with a hoist suspended from an overhead trolley. Water and brine quenches are contained in two cylindrical tanks.

For the temperature control of the various furnaces in this division, two recording and controlling and five indicating and controlling pyrometers are mounted on a centrally located control board.

Also one section of this division is set aside for the inspection of parts treated in any one of the three separate divisions of the heat-treating department. This routine inspection for hardness, case depth, etc., is supplemented by complete chemical anaylsis and microscopic examination and physical tests whenever necessary. These latter tests are made in a metallurgical laboratory, which is housed in an engineering laboratory building.

Premium and Bonus Systems Increase

PREMIUM and bonus systems of wage payments in effect in 1935 cover approximately three times as many wage earners as in 1924, according to data collected by the National Industrial Conference Board in a survey of financial incentives in modern industry. The proportion of wage earners on piece rates has dropped two-fifths in the same interval, while the proportion on time rates is virtually unchanged. The report covers 631 companies employing more than 700,000 wage earners.

Premium or bonus plans are relatively more popular in the medium-size plants than in either the very small or very large establishments. In plants employing between 250 and 999 wage earners, 23.2 per cent were being paid under premium or bonus plans. In plants employing from 1000 to 4999 the proportion was 24.4 per cent. This contrasts with the percentages in the small plants and large plants, 14.1 per cent and 19.9 per cent respectively.

Straight-time rates are most common in the automotive industry where 83.4 per cent of the workers are paid on that basis. Individual piece rates lead in the clothing industry, 80.4 per cent of the workers being compensated on that plan as compared with 15.7 per cent on straight time and 3.8 per cent on premium or bonus plans.

Reports from the printing and publishing establishments indicate that 54.0 per cent of the wage earners are on premium or bonus plans, 44.0 per cent on straight time and only 2.0 per cent on individual piece rates.

The NRA, according to reports received by the board, did not have a uniform effect on wage incentive plans in all plants. Three times as many companies reported that the NRA had increased the use of incentives as found that it had the opposite effect.

The main reason for the increased use of incentives on account of the NRA was the need for greater economy. This need arose from the increase in costs resulting from reduction in working hours and the establishment of minimum wage scales.

Many companies pay all employees on the basis of time rates. It is very rare, however, for all employees to be paid by any method other than time. Frequently a large proportion of the total working force is under some incentive system, but usually there are some occupations or some types of work that do not seem to be adapted to incentive payment methods.

Of the 631 reporting companies in the 1935 survey of the board, 22.8 per cent used only time rates, 1.7 per cent reported that a premium or bonus plan was used exclusively and 1.3 per cent that all employees were on piece rates; the remaining 74.2 per cent of companies have more than one method in force.

The most usual combination is that of time and piece rates, more than one third of the companies in the survey reporting this combination. Next in favor is the simultaneous use of time rates and premium and bonus systems found in 21.7 per cent of the companies. All three methods are used in 15.8 per cent. At least some wage earners are paid on a straight time basis in 96.7 per cent of the reporting companies.

Machinery & Welder Corpn., Chicago, has absorbed Welding Equipment & Machinery Corpn., 240 South Boyle Avenue, St. Louis, and will continue operations at St. Louis address as branch office of Machinery & Welder Corpn. Complete stocks of materials will be carried at St. Louis.

Hydraulic Press Mfg. Co., Mount Gilead, Ohio, builder of hydro-power presses for production service, has established branch office in Curtis Building, 2842 West Grand Boulevard, Detroit, in charge of Reider Thoreson.

JUST BETWEEN US TWO

Please Make It Two

IF a publisher did a good deed and up popped a good fairy with the usual promise to grant a wish, the publisher would spend an unhappy ten minutes trying to decide whether to wish for more advertising or a higher subscription renewal percentage.

Greater advertising volume, with its potent pocketbook appeal, would probably win, but the publisher would wonder the rest of his life whether he made the right decision, for a high renewal percentage is a matter of great pride to a publisher, as it is the measure of his success in his profession.

Astute salesmanship can increase advertising volume and circulation, but merit alone keeps readers coming back for more.

With that prelude, we announce with thanks to you that The Iron Age has attained the altitudinous renewal figure of 83.15 per cent, a gain of 0.49 point over the previous six months.

We Knew Him When—

IF you had occasion to visit The Iron Age print shop in the happy Harding days of '22 and '23 you might have noticed a tall, quiet copy boy weaving his way among the presses and minding his own business at a great rate.

The Coolidge boom had yet to begin. Things were slow; advancement was not rapid enough to suit this copy boy. It might be years, he reasoned, before he would be earning big money as a compositor. So he left the printing business flat, and, being handy with his fists, began to pick up a little money boxing in small fight clubs.

He boxed so well that now he is the world's heavyweight champion. The name, of course, is Braddock—James J.

Phidias in Wire

THE Procter-Gamble people increase soap sales by offering prizes for the best sculptures made from Ivory soap. Those ingenious wiregraphs Bethlehem is featuring in its Bethanized wire advertisements make us yearn to get our hands on a couple of yards of wire, twist it around and see what happens. Maybe Alexander Calder, who makes them—the wiregraphs—gives lessons.

Help

IF you know of anything better than coal oil or plumbago to use on chills for cast alloy grinding balls you might drop a line to the Reader Service Dept., The Iron Age, 239 W. 39th St., N. Y.

Indians All Around

THE inscription, "Established 1785," on the letterhead of subscriber William S. Meyer Scale Co., Newark, N. J., made us wonder what subscriber is oldest. We didn't wonder long, for along came the letterhead of the Taylor-Wharton Iron and Steel Co. marked "Founded in 1742."

We can imagine one Taylor saying to another in 1855, *"How long do you suppose that little sheet, The Iron Age, that young fellow John Williams is getting out, will last?"*

From four pages The Iron Age has grown to be bigger than any. This is the type of boast that will surely wound the soul of the Oberleutnant, and we are sorry, but the truth must be told.

Two Men, Two Opinions

A MANUFACTURER of punches and dies writes:

> *"Your editorials contain so much of economic truth, which is habitually overlooked, that I am wondering if they are available in pamphlet form for distribution to certain friends . . . who are teaching economic fallacies."*

An engineer connected with a large manufacturing firm says The Iron Age *"is the 'top' for all information in its field, and is a liberal education each week,"* but counterbalances that compliment by foaming at the mouth about our editorials. He doesn't like them even a little bit.

Glory be, this is a country where every man is not only entitled to his own opinion, but where he can express it without being given free transportation to a concentration camp.

The series of editorials in The Iron Age is arousing greater interest than anything else we ever heard of in industrial journalism. They leave no one cold. Torrid critics are far outnumbered by warm admirers.

Beginning next week, this column takes its annual two weeks' vacation.—A.H.D.

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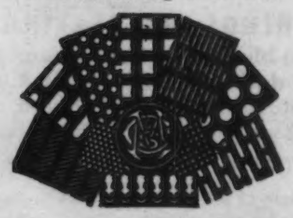

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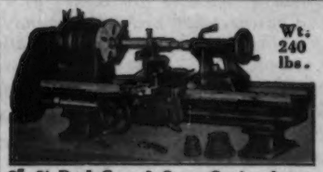

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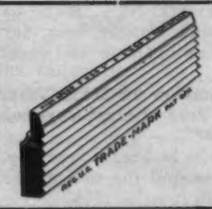

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